Tran, M.
09/991610
considered
6/12/03

-key terms

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     FILE 'REGISTRY' ENTERED AT 14:37:31 ON 08 JAN 2003
                E SILICON CARBIDE/CN 5
L1           1379 S SILICON CARBIDE ?/CN
                E CARBON/CN
L2             14 S E3-E15 OR E17 OR E19 OR E22
L3              5 S E26-E28 OR E30 OR E31
L4           1398 S L1 OR L2 OR L3

     FILE 'HCAPLUS' ENTERED AT 14:48:40 ON 08 JAN 2003
L1           1379 SEA FILE=REGISTRY ABB=ON  PLU=ON  SILICON CARBIDE ?/CN
L2             14 SEA FILE=REGISTRY ABB=ON  PLU=ON  (CARBON/CN OR "CARBON
                  (C1+)"/CN OR "CARBON (C182)"/CN OR "CARBON (C2)"/CN OR
                  "CARBON (C2+)"/CN OR "CARBON (C21+)"/CN OR "CARBON
                  (C21-)"/CN OR "CARBON (C3)"/CN OR "CARBON (C3+)"/CN OR
                  "CARBON (C300)"/CN OR "CARBON (C4)"/CN OR "CARBON
                  (C4+)"/CN OR "CARBON (C41+)"/CN) OR "CARBON (C5)"/CN OR
                  "CARBON (C51+)"/CN OR "CARBON (C60)"/CN
L3              5 SEA FILE=REGISTRY ABB=ON  PLU=ON  ("CARBON (C61+)"/CN OR
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                  (C71+)"/CN OR "CARBON (C78)"/CN
L4           1398 SEA FILE=REGISTRY ABB=ON  PLU=ON  L1 OR L2 OR L3
L5           8617 SEA FILE=HCAPLUS ABB=ON  PLU=ON  ((NANOTUB? OR NANO(W)TUB
                  ?) AND (L4 OR CARBON OR (SILICON OR SI)(W)(CARBIDE OR C)
                  OR SIC)) OR CNT(S)(NANOTUB? OR NANO TUBE)
L6              3 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L5 AND LIBRAR?



L1           1379 SEA FILE=REGISTRY ABB=ON  PLU=ON  SILICON CARBIDE ?/CN
L2             14 SEA FILE=REGISTRY ABB=ON  PLU=ON  (CARBON/CN OR "CARBON
                  (C1+)"/CN OR "CARBON (C182)"/CN OR "CARBON (C2)"/CN OR
                  "CARBON (C2+)"/CN OR "CARBON (C21+)"/CN OR "CARBON
                  (C21-)"/CN OR "CARBON (C3)"/CN OR "CARBON (C3+)"/CN OR
                  "CARBON (C300)"/CN OR "CARBON (C4)"/CN OR "CARBON
                  (C4+)"/CN OR "CARBON (C41+)"/CN) OR "CARBON (C5)"/CN OR
                  "CARBON (C51+)"/CN OR "CARBON (C60)"/CN
L3              5 SEA FILE=REGISTRY ABB=ON  PLU=ON  ("CARBON (C61+)"/CN OR
                  "CARBON (C7)"/CN OR "CARBON (C70)"/CN) OR "CARBON
                  (C71+)"/CN OR "CARBON (C78)"/CN
L4           1398 SEA FILE=REGISTRY ABB=ON  PLU=ON  L1 OR L2 OR L3
L5           8617 SEA FILE=HCAPLUS ABB=ON  PLU=ON  ((NANOTUB? OR NANO(W)TUB
                  ?) AND (L4 OR CARBON OR (SILICON OR SI)(W)(CARBIDE OR C)
                  OR SIC)) OR CNT(S)(NANOTUB? OR NANO TUBE)
L7            349 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L5 AND PROBE
L8             29 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L7 AND (OLIGONUCLEOTIDE
                  OR NUCLEOTIDE OR NUCLEIC OR DNA OR DEOXYRIBONUCLEIC OR
                  DEOXY RIBONUCLEIC OR LIGAND OR PEPTIDE OR PROTEIN OR
                  POLYPEPTIDE OR POLYPROTEIN)



L9             32 L6 OR L8

L9   ANSWER 1 OF 32  HCAPLUS  COPYRIGHT 2003 ACS
ACCESSION NUMBER:         2002:918453  HCAPLUS
DOCUMENT NUMBER:          137:381902
TITLE:                    Gene sequence determination apparatus comprising
                          nucleotide modified carbon
```

nanotube probing needles for complementary H-bonding detection

INVENTOR(S): Hidaka, Kishio; Miyauchi, Akihiro; Hayashihara, Mitsuo; Miyahara, Yuji

PATENT ASSIGNEE(S): Hitachi Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002350435	A2	20021204	JP 2001-161584	20010530

PRIORITY APPLN. INFO.: JP 2001-161584 20010530

AB An app. for detg. gene sequences based on detection of attractive force assocd. with specific complementary hydrogen bonding between each type of **nucleotide** base with a **probe** consisting of **carbon nanotube** modified with **nucleotide**, is disclosed. **Carbon nanotubes** are bonded to a probing needle made of precious metal like tungsten, nickel, iron, cobalt, or gold via bonding material made of gold, platinum, titanium, rhenium, silicon, or tungsten. Codons are used to modify **carbon nanotubes**. A magnetic field or elec. field is used to suppress noise by applying const. pressure or cyclic pressure.

L9 ANSWER 2 OF 32 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2002:842261 HCAPLUS

TITLE: Integration of nanosensors in microstructures

AUTHOR(S): Shi, Li; Wu, Guanghua; Majumdar, Arun

CORPORATE SOURCE: Department of Mechanical Engineering, University of California, Berkeley, CA, 94720, USA

SOURCE: Proceedings of the Symposium on Energy Engineering Sciences, 18th, Argonne, IL, United States, May 15-16, 2000 (2000), 194-201. National Technical Information Service: Springfield, Va.
CODEN: 69DFYN

DOCUMENT TYPE: Conference

LANGUAGE: English

AB This paper reports two examples where nanosensors have been integrated with microfabricated structures to provide new functional devices. The first is the integration of nanoscale temp. sensors on **probe** tips that have been used to study thermophysics of low-dimensional nanostructures such as **carbon nanotubes**. Thermal images at 50 nm spatial resoln. are revealing the dissipation mechanisms in multiwall and single-wall **carbon nanotubes**. We report the direct observation of defect scattering on phonon transport in such **nanotubes**. The second example involves the generation of nanomech. motion of a cantilever beam using specific biol. reactions such as **DNA** hybridization and **protein-ligand** binding. We report here some new observations as well as the thermodn. principles of how motion is created at nanoscales.

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE

FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 3 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2002:737862 HCAPLUS
DOCUMENT NUMBER: 138:10918
TITLE: Water-Soluble and Optically pH-Sensitive Single-Walled **Carbon Nanotubes** from Surface Modification
AUTHOR(S): Zhao, Wei; Song, Chulho; Pehrsson, Pehr E.
CORPORATE SOURCE: Department of Chemistry, University of Arkansas, Little Rock, AR, 72204, USA
SOURCE: Journal of the American Chemical Society (2002), 124(42), 12418-12419
CODEN: JACSAT; ISSN: 0002-7863
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB There is great interest in using single-walled **carbon nanotubes** (SWNTs) as nanoscale **probes** and sensors in biol. electronics and optical devices because the electronic and optical properties of SWNTs are extremely sensitive to the surrounding environments. A well-controlled modification of SWNT surfaces may provide unique interfaces that are sensitive to the biol. variables such as pH, glucose, various ions and **proteins**. The authors report a facile chem. routine to prep. water-sol. SWNTs that still retain their van Hove singularities after acid oxidative treatment. The aq. solns. (0.03-0.15 mg/mL) are stable for more than a month. The soly. in water for as-treated SWNTs with surfaces modified by carboxylate groups provides one with a unique opportunity to reveal the relation of the SWNT electronic and optical properties with pH. Here the authors present the 1st observation that after surface modification with carboxylate groups, the optical absorption of the 1st interband transition of as-treated water-sol. semiconducting SWNTs reversibly responds to the pH change in aq. solns. Surface modification of SWNTs is a promising way for prepg. chem. selective SWNT interfaces, which may open new exciting opportunities for various applications.
REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 4 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2002:604814 HCAPLUS
TITLE: Scanning force microscopy three-dimensional modes applied to the study of the dielectric response of adsorbed **DNA** molecules
AUTHOR(S): Gomez-Navarro, C.; Gil, A.; Alvarez, M.; De Pablo, P. J.; Moreno-Herrero, F.; Horcas, I.; Fernandez-Sanchez, R.; Colchero, J.; Gomez-Herrero, J.; Baro, A. M.
CORPORATE SOURCE: Laboratorio de Nuevas Microscopias, Departamento de Fisica de la Materia Condensada, Universidad Autonoma de Madrid, Madrid, E-28049, Spain
SOURCE: Nanotechnology (2002), 13(3), 314-317
CODEN: NNOTER; ISSN: 0957-4484
PUBLISHER: Institute of Physics Publishing
DOCUMENT TYPE: Journal

LANGUAGE: English

AB We have developed a set of working modes for scanning **probe** microscopy (SPM), which generalizes the usual method of acquiring data. We call these modes three-dimensional (3D) modes. Using these modes it is possible to measure typical SPM magnitudes, such as, for example, the tunnel current, the normal force and the amplitude or frequency of the cantilever oscillation, as a function of any other two magnitudes of the system: f(.eta.hi1, .eta.hi2). In this paper we present different examples of 3D modes. In particular, we have applied 3D modes to the study of the electrostatic interaction of co-adsorbed single walled **carbon nanotubes** and individual **DNA** mols. with a metallic scanning force microscopy tip. The data indicate that adsorbed **DNA** has a dielec. const. similar to that of the glass substrate.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 5 OF 32 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2002:445073 HCAPLUS

DOCUMENT NUMBER: 137:271147

TITLE: Coulomb blockade and the Kondo effect in single-atom transistors

AUTHOR(S): Park, Jiwoong; Pasupathy, Abhay N.; Goldsmith, Jonas I.; Chang, Connie; Yaish, Yuval; Petta, Jason R.; Rinkoski, Marie; Sethna, James P.; Abruna, Hector D.; McEuen, Paul L.; Ralph, Daniel C.

CORPORATE SOURCE: Laboratory of Atomic and Solid State Physics, Cornell University, Ithaca, NY, 14853, USA

SOURCE: Nature (London, United Kingdom) (2002), 417(6890), 722-725
CODEN: NATUAS; ISSN: 0028-0836

PUBLISHER: Nature Publishing Group

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Using mols. as electronic components is a powerful new direction in the science and technol. of nanometer-scale systems. Expts. to date have examd. a multitude of mols. conducting in parallel, or, in some cases, transport through single mols. The latter includes mols. probed in a two-terminal geometry using mech. controlled break junctions or scanning **probes** as well as three-terminal single-mol. transistors made from **carbon nanotubes**, C60 mols., and conjugated mols. dild. in a less-conducting mol. layer. The ultimate limit would be a device where electrons hop on to, and off from, a single atom between two contacts. Here the authors describe transistors incorporating a transition-metal complex designed so that electron transport occurs through well-defined charge states of a single atom. The authors examine two related mols. contg. a Co ion bonded to polypyridyl **ligands**, attached to insulating tethers of different lengths. Changing the length of the insulating tether alters the coupling of the ion to the electrodes, enabling the fabrication of devices that exhibit either single-electron phenomena, such as Coulomb blockade, or the Kondo effect.

REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE

IN THE RE FORMAT

L9 ANSWER 6 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2002:309809 HCAPLUS
DOCUMENT NUMBER: 136:289940
TITLE: Apparatus and method for the analysis of **nucleic** acids hybridization on high density **DNA** chips
INVENTOR(S): Poponin, Vladimir
PATENT ASSIGNEE(S): Virtual Pro, Inc., USA
SOURCE: U.S., 10 pp.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6376177	B1	20020423	US 1999-413596	19991006
US 2002123050	A1	20020905	US 2001-876298	20010607

PRIORITY APPLN. INFO.: US 1999-413596 A3 19991006
AB The invention generally relates to a new gene **probe** biosensor employing near field surface enhanced Raman scattering (NFSERS) for direct spectroscopic detection of hybridized mols. (such as hybridized **DNA**) without the need for labels, and the invention also relates to methods for using the biosensor. The invention provides direct spectroscopic detection of **DNA**-**DNA**, **DNA**-RNA, and RNA-RNA hybridization.
REFERENCE COUNT: 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 7 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2002:235357 HCAPLUS
DOCUMENT NUMBER: 137:2320
TITLE: Direct Visualization of a **DNA** Glycosylase Searching for Damage
AUTHOR(S): Chen, Liwei; Haushalter, Karl A.; Lieber, Charles M.; Verdine, Gregory L.
CORPORATE SOURCE: Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA, 02138, USA
SOURCE: Chemistry & Biology (2002), 9(3), 345-350
CODEN: CBOLE2; ISSN: 1074-5521
PUBLISHER: Cell Press
DOCUMENT TYPE: Journal
LANGUAGE: English
AB **DNA** glycosylases preserve the integrity of genetic information by recognizing damaged bases in the genome and catalyzing their excision. It is unknown how **DNA** glycosylases locate covalently modified bases hidden in the **DNA** helix amongst vast nos. of normal bases. Here we employ at.-force microscopy (AFM) with **carbon nanotube probes** to image search intermediates of human 8-oxoguanine **DNA** glycosylase (hOGG1) scanning **DNA**. We show that hOGG1 interrogates **DNA** at undamaged sites by inducing drastic kinks. The sharp **DNA** bending angle of these non-lesion-specific search intermediates closely matches that obsd.

in the specific complex of 8-oxoguanine-contg. **DNA** bound to hOGG1. These findings indicate that hOGG1 actively distorts **DNA** while searching for damaged bases.

REFERENCE COUNT: 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 8 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2002:220852 HCAPLUS
DOCUMENT NUMBER: 136:242918
TITLE: Direct haplotyping using **carbon nanotube probes**.
INVENTOR(S): Lieber, Charles M.; Woolley, Adam T.; Hahm, Jong-In; Housman, David
PATENT ASSIGNEE(S): Massachusetts Institute of Technology, USA
SOURCE: PCT Int. Appl., 56 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002022889	A2	20020321	WO 2001-US42138	20010912
W: AE, AG, AL, AT, AU, BA, BB, BG, CA, CH, CN, CO, CU, CZ, DE, DK, EC, EE, ES, FI, GB, GD, GH, GM, HU, ID, IL, IN, JP, KE, KP, KR, MD, RU, TJ, TM				
RW: GH, GM, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, ES, FI, FR, GB, IE, IT, NL, PT, SE, TR, BF, CF, CI, CM, GA, GW, ML, MR, NE, SN, TD, TG				
AU 2002011807	A5	20020326	AU 2002-11807	20010912
US 2002146714	A1	20021010	US 2001-951133	20010912

PRIORITY APPLN. INFO.: US 2000-231608P P 20000911
WO 2001-US42138 W 20010912

AB The invention concerns a method for multiplexed detection of polymorphic sites and direct detn. of haplotypes in **DNA** fragments, **DNA**, and genomic **DNA**, using single-walled **carbon nanotube** (SWNT) at. force microscopy (AFM) **probes**. This technique has applications for haplotyping in population-based genetic disease studies and other genomic screening.

L9 ANSWER 9 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2002:189459 HCAPLUS
TITLE: Interaction of Fullerenes and **Nanotubes** with Antibodies
AUTHOR(S): Erlanger, Bernard
CORPORATE SOURCE: Department of Microbiology, Columbia University, New York, NY, 10032, USA
SOURCE: Abstracts of Papers, 223rd ACS National Meeting, Orlando, FL, United States, April 7-11, 2002 (2002), IEC-186. American Chemical Society: Washington, D. C.
CODEN: 69CKQP
DOCUMENT TYPE: Conference; Meeting Abstract
LANGUAGE: English
AB Various applications are being sought for fullerene-based compds. in

fields as diverse as electronics and pharmacotherapeutics. With respect to the latter, it was of interest to det. whether the immune system would recognize fullerenes and produce specific antibodies. After immunization with a fullerene-**protein** conjugate, we succeeded in isolating monoclonal, fullerene-specific antibodies. One of them was characterized with respect to its specificity, and its structure and interaction with fullerenes elucidated by x-ray crystallog. It was also shown to bind to the surface of single wall **carbon nanotubes** (SWNT) as detd. immunochem. and by at. force microscopy. Our findings bridge two disparate disciplines: elec. nanotechnol. and monoclonal immunol., and can have practical consequences, e.g. the use of antibody-coated **nanotubes** as **probes** of cell and membrane function.

L9 ANSWER 10 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2002:175341 HCAPLUS
DOCUMENT NUMBER: 136:346331
TITLE: Heterogeneous Single-Walled **Carbon Nanotube** Catalyst Discovery and Optimization
AUTHOR(S): Chen, Bin; Parker, Goldwyn, II; Han, Jie; Meyyappan, M.; Cassell, Alan M.
CORPORATE SOURCE: Center For Nanotechnology, National Aeronautics and Space Administration, Ames Research Center, Moffett Field, CA, 94035, USA
SOURCE: Chemistry of Materials (2002), 14(4), 1891-1896
CODEN: CMATEX; ISSN: 0897-4756
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB High-throughput methods are utilized in the discovery and optimization of heterogeneous catalyst formulations that promote single-walled **carbon nanotube** (SWNT) synthesis. Catalyst compns., substrates, and reaction conditions are varied to efficiently investigate SWNT growth by chem. vapor deposition (CVD). A robotic microarray printer is employed to print **libraries** of the liq.-based catalyst precursors onto various substrates. After CVD, the catalyst arrays are qual. screened for yield via electron microscopy. More comprehensive characterization of candidate catalysts is further investigated with confocal Raman spectroscopy (CRS). Detailed CRS mapping reveals information concerning the printed catalyst and **nanotube** homogeneity in the microarrays. This powerful characterization approach allows for the high-throughput screening of **nanotube** type, diam. distribution, and purity within the microarrays. The methodol. described has enabled the efficient exploration of synthesis parameters, which has led to the identification of SWNT catalysts with various activities.
IT **7440-44-0P, Carbon**, properties
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(heterogeneous single-walled **carbon nanotube** catalyst discovery and optimization)
REFERENCE COUNT: 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 11 OF 32 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2002:101813 HCAPLUS
DOCUMENT NUMBER: 136:212973
TITLE: Scanned conductance microscopy of **carbon nanotubes** and .lambda.-**DNA**
AUTHOR(S): Bockrath, Marc; Markovic, Nina; Shepard, Adam; Tinkham, M.; Gurevich, Leonid; Kouwenhoven, Leo P.; Wu, Mingshaw W.; Sohn, L. L.
CORPORATE SOURCE: Department of Physics, Harvard University, Cambridge, MA, 02138, USA
SOURCE: Nano Letters (2002), 2(3), 187-190
CODEN: NALEFD; ISSN: 1530-6984
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB We have devised a scanned **probe** technique based on electrostatic force microscopy capable of probing the conductance of samples without requiring attached leads. We demonstrate that, using our technique, conductance can be probed on length scales as small as 0.4 .mu.m. To demonstrate the utility of our technique, we use it to **probe** the conductance of **DNA**, a subject that has been the focus of intense debate with reported results ranging from metallic to insulating. In contrast to conducting single-wall **carbon nanotubes**, used as a control, individual strands of .lambda.-**DNA**, a widely studied sequence, are found to be insulating on the length scale probed.
REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 12 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2001:740240 HCAPLUS
DOCUMENT NUMBER: 136:17465
TITLE: Single molecule **DNA** device measured with triple-**probe** atomic force microscope
AUTHOR(S): Watanabe, Hiroyuki; Manabe, Chikara; Shigematsu, Taishi; Shimotani, Kei; Shimizu, Masaaki
CORPORATE SOURCE: Advanced Research Laboratory, Fuji Xerox Co., Ltd., Corporate Research Center, Takematsu, Minamiashigara-shi, Kanagawa-ken, 250-0111, Japan
SOURCE: Applied Physics Letters (2001), 79(15), 2462-2464
CODEN: APPLAB; ISSN: 0003-6951
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English
AB We have measured the elec. properties of a three-terminal single mol. **DNA** device with a triple-**probe** at. force microscope (T-AFM). The T-AFM permits us to connect a single **DNA** mol. with **carbon nanotube** (**CNT**) electrodes as source, drain, and gate terminals. As the gate bias voltage is increased, the voltage gap region decreased in the current-voltage (I-V) curves. Furthermore, we can observe the clear steps in the I-V curve at crossing the **DNA** mol. and the CNT-gate electrode with gate biased.
REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE

FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 13 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2001:676892 HCAPLUS
DOCUMENT NUMBER: 135:237555
TITLE: Integrated **nucleic** acid hybridization devices for improved kinetics, sensitivity and discrimination power
INVENTOR(S): Hogan, Michael; Powdrill, Thomas; Iverson, Bonnie; Belosludtsev, Yuri Y.; Belosludtsev, Inna Y.
PATENT ASSIGNEE(S): Genometrix Genomix, Inc., USA
SOURCE: PCT Int. Appl., 101 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001066687	A1	20010913	WO 2000-US23438	20000824

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: US 2000-522240 A1 20000309
US 2000-636268 A1 20000810

AB The invention provides devices and methods for enhanced and selective assocn. or binding between biol. materials, such as **nucleic** acids, e.g., **DNA** or RNA, or **polypeptides**, and an immobilized **oligonucleotide probe**. In one embodiment, the invention provides an assocn. device comprising a plurality of **nucleic** acid **probes** or **polypeptide probes** or a combination thereof linked to a solid substrate. The solid substrate comprises a substrate surface comprising an external substrate surface and a plurality of internal pores, wherein the pores comprise a proximal end opening to the external surface to allow passage of fluid into a pore, and wherein the pore surfaces comprise an assocn. surface. The assocn. surface comprises a charged surface comprising net pos. (cationic) charge d. under conditions comprising a pH lower than the pI of the assocn. surface. Methods for making these hybridization/assocn. devices are also provided. Covalent and noncovalent **probe** immobilization methodologies are employed for surface hybridization modeling studies. Incorporating low ionic strength, low pH buffers (together with a net cationic charge d. on the device surface) as hybridization conditions provides significant increases in the kinetics, sensitivity, and discrimination power of **nucleic** acid-based and **polypeptide**-based biosensors and related

hybridization techniques. For example, the devices and methods of the invention can be used in **nucleic** acid-based diagnostic tests. The devices and methods of the invention can be used, e.g., for detecting the assocn. of a **nucleic** acid in a sample to a **nucleic** acid **probe** or purifying a **nucleic** acid from a sample.

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 14 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2001:536702 HCAPLUS
DOCUMENT NUMBER: 136:306095
TITLE: Structural and functional imaging with **carbon nanotube** AFM **probes**
AUTHOR(S): Hafner, J. H.; Cheung, C.-L.; Woolley, A. T.; Lieber, C. M.
CORPORATE SOURCE: Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA, 02138, USA
SOURCE: Progress in Biophysics & Molecular Biology (2001), 77(1), 73-110
CODEN: PBIMAC; ISSN: 0079-6107
PUBLISHER: Elsevier Science Ltd.
DOCUMENT TYPE: Journal; General Review
LANGUAGE: English

AB A review. At. force microscopy (AFM) has great potential as a tool for structural biol., a field in which there is increasing demand to characterize larger and more complex biomol. systems. However, the poorly characterized silicon and silicon nitride **probe** tips currently employed in AFM limit its biol. applications. **Carbon nanotubes** represent ideal AFM tip materials due to their small diam., high aspect ratio, large Young's modulus, mech. robustness, well-defined structure, and unique chem. properties. **Nanotube probes** were first fabricated by manual assembly, but more recent methods based on chem. vapor deposition provide higher resoln. **probes** and are geared towards mass prodn., including recent developments that enable quant. prepn. of individual single-walled **carbon nanotube** tips [J. Phys. Chem. B 105 (2001) 743]. The high-resoln. imaging capabilities of these **nanotube** AFM **probes** have been demonstrated on gold nanoparticles and well-characterized biomols. such as IgG and GroES. Using the **nanotube probes**, new biol. structures have been investigated in the areas of amyloid-beta **protein** aggregation and chromatin remodeling, and new biotechnologies have been developed such as AFM-based haplotyping. In addn. to measuring topog., chem. functionalized AFM **probes** can measure the spatial arrangement of chem. functional groups in a sample. However, std. silicon and silicon nitride tips, once functionalized, do not yield sufficient resoln. to allow combined structural and functional imaging of biomols. The unique end-group chem. of **carbon nanotubes**, which can be arbitrarily modified by established chem. methods, has been exploited for chem. force microscopy, allowing single-mol. measurements with well-defined functionalized tips.

REFERENCE COUNT: 110 THERE ARE 110 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE

IN THE RE FORMAT

L9 ANSWER 15 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2001:465617 HCAPLUS
DOCUMENT NUMBER: 135:164264
TITLE: Reduction of long-range interactions using **carbon nanotube probes** in biological systems
AUTHOR(S): Maeda, Yasushi; Nishijima, Hidehiro; Akita, Seiji; Matsumoto, Takuya; Nakayama, Yoshikazu; Kawai, Tomoji
CORPORATE SOURCE: The Institute of Scientific and Industrial Research, Osaka University, Osaka, 567-0047, Japan
SOURCE: Japanese Journal of Applied Physics, Part 1: Regular Papers, Short Notes & Review Papers (2001), 40(3A), 1425-1428
CODEN: JAPNDE; ISSN: 0021-4922
PUBLISHER: Japan Society of Applied Physics
DOCUMENT TYPE: Journal
LANGUAGE: English
AB **Carbon nanotubes** (**CNT**) have been used as tips in non-contact at. force microscopy (NC-AFM) to observe biomols. including **DNA** mols. Adhesion and electrostatic forces, which affect NC-AFM measurements even in vacuum condition, can be drastically reduced by using a CNT tip without thermal treatments for samples. Consequently, stable imaging of **DNA** mols. was performed under the presence of a water layer and various surface charges on the substrate. This is highly advantageous for imaging biomols., which are denatured easily by thermal treatment.
IT **7440-44-0**, **Carbon**, uses
RL: DEV (Device component use); NUU (Other use, unclassified); USES (Uses)
(**nanotubes**; redn. of long-range interactions in non-contact at. force microscopy using **carbon nanotube** tips for structure detn. in biol. systems)
REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 16 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2001:199616 HCAPLUS
TITLE: **Carbon nanotube probes**: SPM **probe** technology for the future
AUTHOR(S): Chen, Liwei; Cheung, Chin-Li; Haushalter, Karl; Verdine, Gregory; Lieber, Charles
CORPORATE SOURCE: Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA, 02138, USA
SOURCE: Abstr. Pap. - Am. Chem. Soc. (2001), 221st, COLL-360
CODEN: ACSRAL; ISSN: 0065-7727
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal; Meeting Abstract
LANGUAGE: English
AB The contrast of SFM is based on additive interactions between the surface and **probe**, therefore, the resoln. of SFM imaging greatly depends on the geometrical and mech. properties of the

probes. **Carbon nanotubes** make potentially ideal tips for SFM due to its small diam., high aspect ratio, mech. robustness, elec. conductance and chem. functionality at the open end. Here we report the prepn. of **carbon nanotube probes** by individual assembly or direct chem. vapor deposition. High-resoln. imaging in air of hOgg1-**DNA** complexes revealed a previously unknown two-intermediate mechanism by which the **DNA** repair glycosylase hOgg1 searches for damaged bases in the genome. **Carbon nanotube probes** also led to unprecedented high-resoln. images of **DNA** in water (apparent width 3nm). The functionality at the open end of **nanotube probes** was detd. to be carboxylic acid by force titrn. **DNA** unbinding expts. demonstrated that **nanotube probes** can be successfully functionalized with biomols.

L9 ANSWER 17 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2001:168991 HCAPLUS
DOCUMENT NUMBER: 134:198742
TITLE: Dissolution of Full-Length Single-Walled **Carbon Nanotubes**
AUTHOR(S): Chen, Jian; Rao, Apparao M.; Lyuksyutov, Sergei; Itkis, Mikhail E.; Hamon, Mark. A.; Hu, Hui; Cohn, Robert W.; Eklund, Peter C.; Colbert, Daniel T.; Smalley, Richard E.; Haddon, Robert C.
CORPORATE SOURCE: Departments of Chemistry and Physics Advanced Carbon Materials Center, University of Kentucky, Lexington, KY, 40506-0055, USA
SOURCE: Journal of Physical Chemistry B (2001), 105(13), 2525-2528
CODEN: JPCBFK; ISSN: 1089-5647
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Full-length single-walled **carbon nanotubes** (SWNTs) were rendered sol. in common org. solvents by noncovalent (ionic) functionalization of the carboxylic acid groups present in the purified SWNTs. At. force microscopy (AFM) showed that the majority of the SWNTs ropes were exfoliated into small ropes (2-5 nm in diam.) and individual **nanotubes** with lengths of several micrometers during the dissoln. process. The combination of multiwavelength laser excitation Raman scattering spectroscopy and soln.-phase visible and near-IR spectroscopies was used to characterize the **library** of SWNTs that is produced in current prepns. The av. diam. of **nanotubes** with the metallic nature was found by Raman spectroscopy to be smaller than that of semiconducting **nanotubes** in the various types of full-length SWNT prepns. This observation sheds new light on the mechanism of SWNT formation.
REFERENCE COUNT: 30 THERE ARE 30 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 18 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2000:886731 HCAPLUS
DOCUMENT NUMBER: 134:14813
TITLE: **Carbon nanotube**

probe and its biological application
AUTHOR(S): Yoshimura, Shigehiro; Masamura, Yuusuke; Turimoto, Toshiki; Nakayama, Yoshikazu
CORPORATE SOURCE: Grad. Sch. Biostud., Kyoto Univ., Japan
SOURCE: Seibutsu Butsuri (2000), 40(6), 395-397
CODEN: SEBUAL; ISSN: 0582-4052
PUBLISHER: Nippon Seibutsu Butsuri Gakkai
DOCUMENT TYPE: Journal; General Review
LANGUAGE: Japanese
AB A review with 10 refs., on the usefulness of at. force microscopy (AFM) in biol. studies, **carbon nanotube probes** for high-resoln. structural imaging of biomols. by AFM, prodn. method of **carbon nanotube** chips, and visualization of **protein** subunit organization by AFM with **carbon nanotube** chips.

L9 ANSWER 19 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2000:811148 HCAPLUS
DOCUMENT NUMBER: 134:121466
TITLE: Combinatorial Optimization of Heterogeneous Catalysts Used in the Growth of **Carbon Nanotubes**
AUTHOR(S): Cassell, Alan M.; Verma, Sunita; Delzeit, Lance; Meyyappan, M.; Han, Jie
CORPORATE SOURCE: National Aeronautics and Space Administration Ames Research Center, Moffett Field, CA, 94035, USA
SOURCE: Langmuir (2001), 17(2), 260-264
CODEN: LANGD5; ISSN: 0743-7463
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB **Libraries** of liq.-phase catalyst precursor solns. were printed onto iridium-coated silicon substrates and evaluated for their effectiveness in catalyzing the growth of multiwalled **carbon nanotubes** (MWNTs) by chem. vapor deposition (CVD). The catalyst precursor solns. were composed of inorg. salts and a removable triblock copolymer (EO)20(PO)70(EO)20 (EO = ethylene oxide, PO = propylene oxide) structure-directing agent (SDA), dissolved in ethanol/methanol mixts. Sample **libraries** were quickly assayed using SEM after CVD growth to identify active catalysts and CVD conditions. Compn. **libraries** and focus **libraries** were then constructed around the active spots identified in the discovery **libraries** to understand how catalyst precursor compn. affects the yield, d., and quality of the **nanotubes**. Successful implementation of combinatorial optimization methods in the development of highly active, **carbon nanotube** catalysts is demonstrated, as well as the identification of catalyst formulations that lead to varying densities and shapes of aligned **nanotube** towers.
IT **7440-44-0P, Carbon**, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(combinatorial optimization of heterogeneous catalysts used in growth of **carbon nanotubes**)
REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE

IN THE RE FORMAT

L9 ANSWER 20 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2000:581368 HCAPLUS
DOCUMENT NUMBER: 134:127993
TITLE: Atomic force microscopy with **carbon nanotube probe** resolves the subunit organization of **protein** complexes
AUTHOR(S): Hohmura, Ken I.; Itokazu, Yutakatti; Yoshimura, Shige H.; Mizuguchi, Gaku; Masamura, Yu-suke; Takeyasu, Kunio; Shiomi, Yasushi; Tsurimoto, Toshiki; Nishijima, Hidehiro; Akita, Seiji; Nakayama, Yoshikazu
CORPORATE SOURCE: Laboratory of Plasma Membrane and Nuclear Signaling, Graduate School of Biostudies, Kyoto University, Kyoto, 606-8502, Japan
SOURCE: Journal of Electron Microscopy (2000), 49(3), 415-421
CODEN: JELJA7; ISSN: 0022-0744
PUBLISHER: Oxford University Press
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Among many scanning **probe** microscopies, at. force microscopy (AFM) is a useful technique to analyze the structure of biol. materials because of its applicability to non-conductors in physiol. conditions with high resoln. However, the resoln. has been limited to an inherent property of the technique; tip effect assocd. with a large radius of the scanning **probe**. To overcome this problem, we developed a **carbon nanotube probe** by attaching a **carbon nanotube** to a conventional scanning **probe** under a well-controlled process. Because of the const. and small radius of the tip (2.5-10 nm) and the high aspect ratio (1: 100) of the **carbon nanotube**, the lateral resoln. has been much improved judging from the apparent widths of **DNA** and nucleosomes. The **carbon nanotube probes** also possessed a higher durability than the conventional **probes**. We further evaluated the quality of **carbon nanotube probes** by three parameters to find out the best condition for AFM imaging: the angle to the tip axis; the length; and the tight fixation to the conventional tip. These **carbon nanotube probes**, with high vertical resoln., enabled us to clearly visualize the subunit organization of multi-subunit **proteins** and to propose structural models for proliferating cell nuclear antigen and replication factor C. This success in the application of **carbon nanotube probes** provides the current AFM technol. with an addnl. power for the analyses of the detailed structure of biol. materials and the relationship between the structure and function of **proteins**.
REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 21 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2000:514503 HCAPLUS
DOCUMENT NUMBER: 133:345228

TITLE: Direct haplotyping of kilobase-size **DNA** using **carbon nanotube probes**
AUTHOR(S): Woolley, Adam T.; Guillemette, Chantal; Cheung, Chin Li; Housman, David E.; Lieber, Charles M.
CORPORATE SOURCE: Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA, 02138, USA
SOURCE: Nature Biotechnology (2000), 18(7), 760-763
CODEN: NABIF9; ISSN: 1087-0156
PUBLISHER: Nature America Inc.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB We have implemented a method for multiplexed detection of polymorphic sites and direct detn. of haplotypes in 10-kilobase-size **DNA** fragments using single-walled **carbon nanotube** (SWNT) at. force microscopy (AFM) **probes**. Labeled **oligonucleotides** are hybridized specifically to complementary target sequences in template **DNA**, and the positions of the tagged sequences are detected by direct SWNT tip imaging. We demonstrated this concept by detecting streptavidin and IRD800 labels at two different sequences in M13mp18. Our approach also permits haplotype detn. from simple visual inspection of AFM images of individual **DNA** mols., which we have done on UGTIA7, a gene under study as a cancer risk factor. The haplotypes of individuals heterozygous at two crit. loci, which together influence cancer risk, can be easily and directly distinguished from AFM images. The application of this technique to haplotyping in population-based genetic disease studies and other genomic screening problems is discussed.
REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 22 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2000:297383 HCAPLUS
DOCUMENT NUMBER: 132:354108
TITLE: **Carbon nanotubes** as **probes** for atomic force microscopy
AUTHOR(S): Stevens, Ramsey M. D.; Frederick, Neil A.; Smith, Bettye L.; Morse, Daniel E.; Stucky, Galen D.; Hansma, Paul K.
CORPORATE SOURCE: Department of Physics, University of California, Santa Barbara, CA, 93106, USA
SOURCE: Nanotechnology (2000), 11(1), 1-5
CODEN: NNOTER; ISSN: 0957-4484
PUBLISHER: Institute of Physics Publishing
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Tip-derived artifacts remain one of the chief limitations of at. force microscopy (AFM) when attempting to measure sub-nanometer structures. C **nanotubes** represent ideal structures for use as AFM tips because of their small diam., high aspect ratio and high strength. The authors attached single C **nanotube** AFM tips using a novel arc discharge method. Using these modified tips, the authors successfully imaged a **protein** filament found in sponge spicules of Tethya aurantia. The authors report a modular stave-like structure for the **protein** filament that was previously unobservable with conventional AFM cantilevers.

REFERENCE COUNT: 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 23 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2000:270322 HCAPLUS
DOCUMENT NUMBER: 133:86360
TITLE: **Carbon nanotube** atomic force microscopy tips: direct growth by chemical vapor deposition and application to high-resolution imaging
AUTHOR(S): Cheung, Chin Li; Hafner, Jason H.; Lieber, Charles M.
CORPORATE SOURCE: Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA, M02138, USA
SOURCE: Proceedings of the National Academy of Sciences of the United States of America (2000), 97(8), 3809-3813
CODEN: PNASA6; ISSN: 0027-8424
PUBLISHER: National Academy of Sciences
DOCUMENT TYPE: Journal
LANGUAGE: English
AB **Carbon nanotubes** are potentially ideal at. force microscopy **probes** because they can have diams. as small as one nanometer, have robust mech. properties, and can be specifically functionalized with chem. and biol. **probes** at the tip ends. This communication describes methods for the direct growth of **carbon nanotube** tips by chem. vapor deposition (CVD) using ethylene and iron catalysts deposited on com. silicon-cantilever-tip assemblies. SEM and TEM measurements demonstrate that multiwalled **nanotube** and single-walled **nanotube** tips can be grown by predictable variations in the CVD growth conditions. Force-displacement measurements made on the tips show that they buckle elastically and have very small (.ltoreq. 100 pN) nonspecific adhesion on mica surfaces in air. Anal. of images recorded on gold nanoparticle stds. shows that these multi- and single-walled **carbon nanotube** tips have radii of curvature of 3-6 and 2-4 nm, resp. Moreover, the **nanotube** tip radii detd. from the nanoparticle images are consistent with those detd. directly by TEM imaging of the **nanotube** ends. These mol.-scale CVD **nanotube** **probes** have been used to image isolated IgG and GroES **proteins** at high-resoln.
REFERENCE COUNT: 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 24 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2000:230902 HCAPLUS
DOCUMENT NUMBER: 132:341906
TITLE: Microprocess for fabricating **carbon-nanotube probes** of a scanning **probe** microscope
AUTHOR(S): Nakayama, Yoshikazu; Nishijima, Hidehiro; Akita, Seiji; Hohmura, Ken I.; Yoshimura, Shige H.; Takeyasu, Kunio
CORPORATE SOURCE: Department of Physics and Electronics, Osaka Prefecture University, Osaka, 599-8531, Japan

SOURCE: Journal of Vacuum Science & Technology, B: Microelectronics and Nanometer Structures (2000), 18(2), 661-664
CODEN: JVTBD9; ISSN: 0734-211X
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The authors have developed microprocesses to make C-**nanotube probes** for a scanning **probe** microscope. The processes contain elec.-field induced transportation, welding and fixation by electron-beam C deposition and were performed in a scanning electron microscope equipped with two individual manipulable stages. Using the **nanotube probes** produced, a fine structure of helical and twinned **DNA** and an abrupt height transition with high fidelity in a 4.7 GB digital versatile disk are imaged with tapping-mode at. force microscopy in air.

IT **7440-44-0, Carbon**, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(microprocess for fabricating **carbon-nanotube probes** of scanning **probe** microscope)

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 25 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1999:384254 HCAPLUS
DOCUMENT NUMBER: 131:211149
TITLE: **Carbon-nanotube** tips for scanning **probe** microscopy: Preparation by a controlled process and observation of **deoxyribonucleic** acid
AUTHOR(S): Nishijima, Hidehiro; Kamo, Satsuki; Akita, Seiji; Nakayama, Yoshikazu; Hohmura, Ken I.; Yoshimura, Shige H.; Takeyasu, Kunio
CORPORATE SOURCE: Department of Physics and Electronics, Osaka Prefecture University, Sakai, Osaka, 599-8531, Japan
SOURCE: Applied Physics Letters (1999), 74(26), 4061-4063
CODEN: APPLAB; ISSN: 0003-6951
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English

AB We report a controlled process to make **carbon-nanotube** tips for scanning **probe** microscopes. The process consists of three steps: (1) purifn. and alignment of **carbon nanotubes** using electrophoresis, (2) transfer of a single aligned **nanotube** onto a conventional Si tip under the view of a scanning electron microscope, and (3) attachment of the **nanotube** on the Si tip by **carbon** deposition. **Nanotube** tips fabricated using this procedure exhibit strong adhesion and are mech. robust. Finally, the performance of these tips is demonstrated by imaging the fine structure of twinned **DNA** with tapping-mode at. force microscopy in air.

REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR

THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 26 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1999:329622 HCAPLUS
DOCUMENT NUMBER: 131:62130
TITLE: **Carbon nanotube** tips for a scanning **probe** microscope: their fabrication and properties
AUTHOR(S): Akita, Seiji; Nishijima, Hidehiro; Nakayama, Yoshikazu; Tokumasu, Fuyuki; Takeyasu, Kunio
CORPORATE SOURCE: Department of Physics and Electronics, Osaka Prefecture University, Osaka, 599-8531, Japan
SOURCE: Journal of Physics D: Applied Physics (1999), 32(9), 1044-1048
CODEN: JPAPBE; ISSN: 0022-3727
PUBLISHER: Institute of Physics Publishing
DOCUMENT TYPE: Journal
LANGUAGE: English
AB We report a well controlled method to make **carbon nanotube** tips for a scanning **probe** microscope (SPM). A multi-walled **carbon nanotube**, which is purified by the electrophoresis, is transferred onto a conventional Si tip for a SPM using a scanning electron microscope equipped with two independent specimen stages. The **nanotube** is fixed on the Si tip by electron beam deposition of **carbon**. A force curve measurement of **nanotubes** using the **nanotube** tips in the SEM reveals that Young's modulus of a **nanotube** of 20 nm diam. is 1.1 TPa and the fixing of **nanotubes** by the **carbon** deposit is effective. The **nanotube** tips are used to image plasmid **DNAs** on mica by tapping mode. The av. resoln. by using the **nanotube** tips is about two times higher than that by the best Si tips.
IT **7440-44-0, Carbon**, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(deposition; fabrication and performance of **carbon nanotube** tips for a scanning **probe** microscope fixed onto Si tip by electron beam deposition of **carbon**)
REFERENCE COUNT: 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 27 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1999:100743 HCAPLUS
DOCUMENT NUMBER: 130:121849
TITLE: Graphitic **nanotubes** in luminescence assays
INVENTOR(S): Massey, Richard J.; Martin, Mark T.; Dong, Liwen; Lu, Ming; Fischer, Alan; Jameison, Fabian; Liang, Pam; Hoch, Robert; Leland, Jonathan K.
PATENT ASSIGNEE(S): Meso Scale Technology, USA
SOURCE: U.S., 42 pp., Cont.-in-part of U.S. Ser. No. 352,400.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English

FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5866434	A	19990202	US 1996-611347	19960306
US 6203814	B1	20010320	US 1994-352400	19941208
CA 2207282	AA	19960613	CA 1995-2207282	19951208
ZA 9701915	A	19970909	ZA 1997-1915	19970305
CA 2248893	AA	19970912	CA 1997-2248893	19970305
WO 9733176	A1	19970912	WO 1997-US3653	19970305
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
AU 9720737	A1	19970922	AU 1997-20737	19970305
AU 724509	B2	20000921		
EP 885393	A1	19981223	EP 1997-908967	19970305
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
CN 1217791	A	19990526	CN 1997-194334	19970305
JP 2001507787	T2	20010612	JP 1997-531989	19970305
US 6362011	B1	20020326	US 1999-243215	19990202
US 2002086335	A1	20020704	US 2001-7526	20011205

PRIORITY APPLN. INFO.:

US 1994-352400	A2	19941208
US 1996-611347	A	19960306
WO 1997-US3653	W	19970305
US 1999-243215	A1	19990202

AB Graphitic **nanotubes**, which include tubular fullerenes (commonly called "buckytubes") and fibrils, which are functionalized by chem. substitution, are used as solid supports in electrogenerated chemiluminescence assays. The graphitic **nanotubes** are chem. modified with functional group biomols. prior to use in an assay. Assocn. of electrochemiluminescent ruthenium complexes with the functional group biomol.-modified **nanotubes** permits detection of mols. including **nucleic** acids, antigens, enzymes, and enzyme substrates by multiple formats.

IT **7440-44-0, Carbon**, reactions
RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)
(**nanotubes**; graphitic **nanotubes** in luminescence assays of biomols. and biopolymers)

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 28 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1998:770687 HCAPLUS
DOCUMENT NUMBER: 130:136107
TITLE: Single-walled **carbon nanotube probes** for high-resolution nanostructure imaging
AUTHOR(S): Wong, Stanislaus S.; Woolley, Adam T.; Odom,

Teri Wang; Huang, Jin-Lin; Kim, Philip; Vezenov, Dimitri V.; Lieber, Charles M.
CORPORATE SOURCE: Department of Chemistry and Chemical Biology and Division of Engineering and Applied Sciences, Harvard University, Cambridge, MA, 02138, USA
SOURCE: Applied Physics Letters (1998), 73(23), 3465-3467
CODEN: APPLAB; ISSN: 0003-6951
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Single-walled **carbon nanotube** (SWNT) tips have been used to image nanostructures with high resoln. Studies of gold nanocrystal stds. showed that SWNT tips provide a significant improvement in lateral resoln. with respect to multi-walled **nanotube** tips and microfabricated Si tips. The **nanotube** tips were also used to resolve substructure within SWNTs deposited on surfaces. These results suggest that obsd. 1.5 nm high structures can correspond to several SWNTs aligned in parallel. In addn., SWNT tips exhibited superior resoln. compared to conventional tips when imaging biol. nanostructures, such as double-stranded **DNA**. The potential and future challenges of SWNT tips are discussed.
REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 29 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1998:112488 HCAPLUS
DOCUMENT NUMBER: 128:151420
TITLE: Macroscopically manipulable nanoscale devices made from **nanotube** assemblies
INVENTOR(S): Colbert, Daniel T.; Dai, Hongjie; Hafner, Jason H.; Rinzler, Andrew G.; Smalley, Richard E.
PATENT ASSIGNEE(S): William Marsh Rice University, USA; Colbert, Daniel T.; Dai, Hongjie; Hafner, Jason H.; Rinzler, Andrew G.; Smalley, Richard E.
SOURCE: PCT Int. Appl., 76 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9805920	A1	19980212	WO 1997-US13896	19970808
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
AU 9740552	A1	19980225	AU 1997-40552	19970808
EP 927331	A1	19990707	EP 1997-938159	19970808
R: DE, FR, GB, IE				

JP 2000516708	T2	20001212	JP 1998-508225	19970808
US 2002084410	A1	20020704	US 2001-746	20011130
US 2002088938	A1	20020711	US 2001-38204	20011221
US 2002092983	A1	20020718	US 2001-27568	20011221
US 2002092984	A1	20020718	US 2001-28231	20011221
US 2002096634	A1	20020725	US 2001-27671	20011221
US 2002102201	A1	20020801	US 2001-36684	20011221
US 2002109086	A1	20020815	US 2001-27750	20011221
US 2002109087	A1	20020815	US 2001-27753	20011221

PRIORITY APPLN. INFO.: US 1996-23732P P 19960808
WO 1997-US13896 W 19970808
US 1999-242040 B1 19990913
US 2001-746 A3 20011130

AB Macroscopically manipulable nanoscale devices made from **nanotube** assemblies are disclosed. The article of manuf. comprises a macroscopic mounting element capable of being manipulated or obsd. in a macroscale environment, and a nanoscale **nanotube** assembly attached to the mounting element. The article permits macroscale information to be provided to or obtained from a nanoscale environment. A method for making a macroscopically manipulable nanoscale devices comprises the steps of (1) providing a **nanotube**-contg. material; (2) prepg. a **nanotube** assembly device having at least one **carbon** **nanotube** for attachment; and (3) attaching said **nanotube** assembly to a surface of a mounting element.

L9 ANSWER 30 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1997:618265 HCAPLUS
DOCUMENT NUMBER: 127:275017
TITLE: Graphitic **nanotubes** in luminescence assays
INVENTOR(S): Massey, Richard J.; Martin, Mark T.; Dong, Liwen; Lu, Ming; Fischer, Alan; Jameison, Fabian; Liang, Pam; Hoch, Robert; Leland, Jonathon K.
PATENT ASSIGNEE(S): Igen, Inc., USA
SOURCE: PCT Int. Appl., 118 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9733176	A1	19970912	WO 1997-US3653	19970305
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
US 5866434	A	19990202	US 1996-611347	19960306
AU 9720737	A1	19970922	AU 1997-20737	19970305
AU 724509	B2	20000921		
EP 885393	A1	19981223	EP 1997-908967	19970305

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI

JP 2001507787 T2 20010612 JP 1997-531989 19970305

PRIORITY APPLN. INFO.: US 1996-611347 A 19960306
US 1994-352400 A2 19941208
WO 1997-US3653 W 19970305

AB Graphitic **nanotubes**, which include tubular fullerenes (commonly called "buckytubes") and fibrils, which are functionalized by chem. substitution, are used as solid supports in electrogenerated chemiluminescence assays. The graphitic **nanotubes** are chem. modified with functional group biomols. prior to use in an assay. Assocn. of electrochemiluminescent ruthenium complexes with the functional group biomol.-modified **nanotubes** permits detection of mols. including **nucleic** acids, antigens, enzymes, and enzyme substrates by multiple formats.

IT **7440-44-0, Carbon**, reactions
RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)
(**nanotubes**; graphitic **nanotubes** in luminescence assays of biomols. and biopolymers)

L9 ANSWER 31 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1997:77063 HCAPLUS
DOCUMENT NUMBER: 126:86777
TITLE: **Probes** for sensing and manipulating microscopic environments and structures
INVENTOR(S): Baldeschwieler, John D.; Baselt, David; Unger, Mark A.; O'Connor, Stephen D.
PATENT ASSIGNEE(S): California Institute of Technology, USA
SOURCE: PCT Int. Appl., 47 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9638705	A1	19961205	WO 1996-US6777	19960513
W: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI				
RW: KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML				
US 5824470	A	19981020	US 1995-453958	19950530
AU 9658575	A1	19961218	AU 1996-58575	19960513

PRIORITY APPLN. INFO.: US 1995-453958 19950530
WO 1996-US6777 19960513

AB **Probes** for sensing and manipulating microscopic environments and structures, their method of prepn., and methods of use are disclosed. The invention relates esp. to a chem. functionalized scanning **probe** tip. **Probes** are provided for functions beyond the imaging of microscopic surfaces, e.g., tips are provided with specific functional moieties to target and/or interact with biol. mols. in vivo or to assist in nanochem.,

lithog., or nanofabrication techniques. Accordingly, an object of the invention is to provide a method of prepg. a **probe** tip functionalized with chem. moieties. Another object involves the prepn. of a **probe** tip suitable for scanning **probe** microscopy comprising a single macromol. attached at its apex. Several other objects of the invention are described.

IT **7440-44-0, Carbon**, reactions
RL: DEV (Device component use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(**probes** for sensing and manipulating microscopic environments and structures)

L9 ANSWER 32 OF 32 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1996:526843 HCAPLUS
DOCUMENT NUMBER: 125:216033
TITLE: Morphological modeling of atomic force microscopy imaging including nanostructure **probes** and fibrinogen molecules
AUTHOR(S): Wilson, David L.; Dalal, Pranav; Kump, Kenneth S.; Benard, William; Xue, Ping; Marchant, Roger E.; Eppell, Steven J.
CORPORATE SOURCE: Department Biomedical Engineering, Case Western Reserve University, Cleveland, OH, 44106, USA
SOURCE: Journal of Vacuum Science & Technology, B: Microelectronics and Nanometer Structures (1996), 14(4), 2407-2416
CODEN: JVTBD9; ISSN: 0734-211X
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Due to the finite size of the **probe** tip, at. force microscopy (AFM) images of biomols., and other structures similar in size, are laterally enlarged. We use math. morphol., a nonlinear image processing method, to model the interaction between **probe** tip and sample. In a typical imaging situation, baseline dimensions are most affected by the **probe** and widths can be 80% tip and 20% mol. By using the morphol. model and a known tip, we can restore the image so that it more closely resembles the actual surface. Morphol. restoration is ideal in some regions, giving the exact sample surface, and improved in others. In the case of a **carbon probe**, restoration increases the perfectly obtained surface area by as much as 160 times. Following restoration, lateral widths at fixed heights are improved by as much as 75%. Restoration greatly improves image resoln. even if one uses **probes** consisting of very small candidate structures, e.g., **nanotubes** and Bucky balls. The tip imaging process is also modeled, and we find that calibration spheres should be larger than the mols. of interest and that for many tips, there is little or no advantage to using smaller spheres. A blood plasma **protein**, fibrinogen, is modeled, and AFM and restored images of single mols. are computed.

L10 926 SEA FILE=HCAPLUS ABB=ON PLU=ON SWNT(S)SINGL?
L11 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L10 AND LIBRAR?

L10 926 SEA FILE=HCAPLUS ABB=ON PLU=ON SWNT(S)SINGL?

L12 40 SEA FILE=HCAPLUS ABB=ON PLU=ON L10 AND PROBE
L13 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L12 AND (OLIGONUCLEOTIDE OR NUCLEOTIDE OR NUCLEIC OR DNA OR DEOXYRIBONUCLEIC OR DEOXY RIBONUCLEIC OR LIGAND OR PEPTIDE OR PROTEIN OR POLYPEPTIDE OR POLYPROTEIN)

L14 0 (L11 OR L13) NOT L9

(FILE 'MEDLINE, BIOSIS, EMBASE, WPIDS, CONFSCI, SCISEARCH, JICST-EPLUS, JAPIO, PROMT, COMPENDEX, INSPEC' ENTERED AT 14:54:43 ON 08 JAN 2003)
L15 15 S L6
L16 108 S L8
L17 4 S L11
L18 9 S L13
L19 24 S L16 AND SINGL? WALL?
L20 6 S L16 AND LABEL?
L21 39 S L15 OR L17 OR L18 OR L19 OR L20
L22 24 DUP REM L21 (15 DUPLICATES REMOVED)

L22 ANSWER 1 OF 24 PROMT COPYRIGHT 2003 Gale Group

ACCESSION NUMBER: 2002:466341 PROMT
TITLE: Emerging trends in plastics technology.
AUTHOR(S): Mukhopadhyay, Prithu
SOURCE: Plastics Engineering, (Sept 2002) Vol. 58, No. 9, pp. 28(8).
ISSN: ISSN: 0091-9578.
PUBLISHER: Society of Plastics Engineers, Inc.
DOCUMENT TYPE: Newsletter
LANGUAGE: English
WORD COUNT: 4126
FULL TEXT IS AVAILABLE IN THE ALL FORMAT

AB Polymers are the backbone of plastics. The giants of the molecular world, they can be built from simple molecules (monomers) into stars, chains, brushes and trees to generate desired application-specific qualities. The objective of this review is to highlight some examples of exciting, emerging developmental trends in plastics and in their technologies. The scope is not limited to documenting a series of developments in plastics technology but also to inform readers where these events are taking place.

Subscription: $50.00 per year. Published monthly. 14 Fairfield Drive, P.O. Box 0403, Brookfield, CT 06804-0403.

L22 ANSWER 2 OF 24 PROMT COPYRIGHT 2003 Gale Group

ACCESSION NUMBER: 2002:236815 PROMT
TITLE: New products increase competition in portable XRF market.
SOURCE: Instrumenta, (17 Apr 2002) Vol. 19, No. 1, pp. 5.
PUBLISHER: PJB Publications
DOCUMENT TYPE: Newsletter
LANGUAGE: English
WORD COUNT: 725
FULL TEXT IS AVAILABLE IN THE ALL FORMAT

AB SALES of hand-held XRF instruments were around $40 million last year worldwide, compared with the $350 million to $400 million for traditional XRF instruments, but if new product introductions at Pittcon 2002 are anything to go by, then this is a sector that is set to see even faster growth than it has over the past couple of years.

Subscription: $595.00 per year. Published semimonthly.

L22 ANSWER 3 OF 24 PROMT COPYRIGHT 2003 Gale Group

ACCESSION NUMBER: 2002:465743 PROMT
TITLE: Descending from the micro- to nano-scale electronics promises to extend Moore's Law indefinitely -- Nanotechnology is rebuilding electronics one atom at a time.(NANOSTRUCTURES)
AUTHOR(S): Johnson, R. Colin
SOURCE: Electronic Engineering Times, (16 Sep 2002) . ISSN: ISSN: 0192-1541.
PUBLISHER: CMP Media, Inc.
DOCUMENT TYPE: Newsletter
LANGUAGE: English
WORD COUNT: 4005
FULL TEXT IS AVAILABLE IN THE ALL FORMAT

AB Byline: R. Colin Johnson

L22 ANSWER 4 OF 24 PROMT COPYRIGHT 2003 Gale Group

ACCESSION NUMBER: 2002:465762 PROMT
TITLE: COMPANIES TO WATCH -- The following selected list of resources includes companies and organizations that are doing work with, in and around the technologies we've explored in this issue.(COMPANIES TO WATCH)
SOURCE: Electronic Engineering Times, (16 Sep 2002) . ISSN: ISSN: 0192-1541.
PUBLISHER: CMP Media, Inc.
DOCUMENT TYPE: Newsletter
LANGUAGE: English
WORD COUNT: 3336
FULL TEXT IS AVAILABLE IN THE ALL FORMAT

AB NANOSTRUCTURES (PAGE 55)

L22 ANSWER 5 OF 24 WPIDS (C) 2003 THOMSON DERWENT
ACCESSION NUMBER: 2002-442627 [47] WPIDS
CROSS REFERENCE: 2003-017188 [01]
DOC. NO. NON-CPI: N2002-348618
DOC. NO. CPI: C2002-125991
TITLE: Detecting hybridized, unlabeled **nucleic** acid, useful e.g. for sequencing and diagnosis, from characteristic lattice vibrations in surface-enhanced Raman spectroscopy.

DERWENT CLASS: B04 D16 S03 U12
INVENTOR(S): POPONIN, V
PATENT ASSIGNEE(S): (VIRT-N) VIRTUAL PRO INC
COUNTRY COUNT: 1
PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
US 6376177	B1	20020423	(200247)*		10

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
US 6376177	B1	US 1999-413596	19991006

PRIORITY APPLN. INFO: US 1999-413596 19991006
AN 2002-442627 [47] WPIDS
CR 2003-017188 [01]
AB US 6376177 B UPAB: 20030101
NOVELTY - Determining if an unlabeled **DNA** sample comprises double-stranded (ds) **DNA**, comprising analyzing the sample, associated with a SERS (surface-enhanced Raman spectroscopy) substrate, by near-field infra-red Raman spectroscopy (RS), is new. If the sample produces lattice vibrations, the presence of ds-**DNA** is indicated.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a similar method for detecting hybridized, unlabeled **DNA** or RNA.

USE - The method is used to detect hybridization of test samples to **nucleic** acids immobilized on the substrate, e.g. for sequencing, mapping, screening and diagnosis, e.g. of single-**nucleotide** polymorphisms associated with hemophilia, sickle cell anemia or other genetic diseases.

ADVANTAGE - Hybridization can now be detected without the expense and time involved in **labeling**. The method has better spectral sensitivity than known processes, especially when used with high-density **nucleic** acid chips. Specifically spectral resolution is in the nanometer range, 1000 times greater than for conventional luminescent **probes**, making possible use of multimode fiber **probes** for reading the substrate surface, and high throughput screening without amplification. Dwg.0/4

L22 ANSWER 6 OF 24 SCISEARCH COPYRIGHT 2003 ISI (R)
ACCESSION NUMBER: 2002:333727 SCISEARCH
THE GENUINE ARTICLE: 542DR
TITLE: Heterogeneous single-walled **carbon nanotube** catalyst discovery and optimization
AUTHOR: Chen B; Parker G; Han J; Meyyappan M; Cassell A M (Reprint)
CORPORATE SOURCE: NASA, Ames Res Ctr, Ctr Nanotechnol, M-S 229-1, Moffet Field, Moffett Field, CA 94035 USA (Reprint); NASA, Ames Res Ctr, Ctr Nanotechnol, Moffett Field, CA 94035 USA
COUNTRY OF AUTHOR: USA
SOURCE: CHEMISTRY OF MATERIALS, (APR 2002) Vol. 14, No. 4,

pp. 1891-1896.
Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036 USA.
ISSN: 0897-4756.
DOCUMENT TYPE: Article; Journal
LANGUAGE: English
REFERENCE COUNT: 31

ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

AB High-throughput methods are utilized in the discovery and optimization of heterogeneous catalyst formulations that promote **single**-walled **carbon nanotube** (**SWNT**) synthesis. Catalyst compositions, substrates, and reaction conditions are varied to efficiently investigate **SWNT** growth by chemical vapor deposition (CVD). A robotic microarray printer is employed to print **libraries** of the liquid-based catalyst precursors onto various substrates. After CVD, the catalyst arrays are qualitatively screened for yield via electron microscopy. More comprehensive characterization of candidate catalysts is further investigated with confocal Raman spectroscopy (CRS). Detailed CRS mapping reveals information concerning the printed catalyst and **nanotube** homogeneity in the microarrays. This powerful characterization approach allows for the high-throughput screening of **nanotube** type, diameter distribution, and purity within the microarrays. The methodology described has enabled the efficient exploration of synthesis parameters, which has led to the identification of **SWNT** catalysts with various activities.

L22 ANSWER 7 OF 24 MEDLINE

ACCESSION NUMBER: 2002728626 IN-PROCESS
DOCUMENT NUMBER: 22379095 PubMed ID: 12490938

TITLE: Nanotechnology: **Carbon nanotubes** with **DNA** recognition.

AUTHOR: Williams Keith A; Veenhuizen Peter T M; De La Torre Beatriz G; Eritja Ramon; Dekker Cees
CORPORATE SOURCE: Department of NanoScience, Delft University of Technology, 2628 CJ Delft, The Netherlands.

SOURCE: NATURE, (2002 Dec 19) 420 (6917) 761.
Journal code: 0410462. ISSN: 0028-0836.
PUB. COUNTRY: England: United Kingdom
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: IN-PROCESS; NONINDEXED; Priority Journals
ENTRY DATE: Entered STN: 20021220
Last Updated on STN: 20021220

AB Since the discovery of their one-dimensional electronic band structure, the leading candidate that has emerged for nanodevice applications is **single-walled carbon nanotubes** (**SWNTs**). Here we unite their unique properties with the specific molecular-recognition features of **DNA** by coupling **SWNTs** to **peptide nucleic** acid (PNA, an uncharged **DNA** analogue) and hybridizing these macromolecular wires with complementary **DNA**. Our findings provide a new, versatile means of incorporating **SWNTs** into larger electronic devices by recognition-based assembly, and of using **SWNTs** as **probes** in biological systems by sequence-specific attachment.

L22 ANSWER 8 OF 24 SCISEARCH COPYRIGHT 2003 ISI (R)
ACCESSION NUMBER: 2002:708289 SCISEARCH
THE GENUINE ARTICLE: 585LV
TITLE: A nano tester: A new technique for nanoscale electrical characterization by point-contact current-imaging atomic force microscopy
AUTHOR: Otsuka Y; Naitoh Y; Matsumoto T; Kawai T (Reprint)
CORPORATE SOURCE: Osaka Univ, Inst Sci & Ind Res, 8-1 Mihogaoka, Ibaraki, Osaka 5670047, Japan (Reprint); Osaka Univ, Inst Sci & Ind Res, Ibaraki, Osaka 5670047, Japan
COUNTRY OF AUTHOR: Japan
SOURCE: JAPANESE JOURNAL OF APPLIED PHYSICS PART 2-LETTERS, (1 JUL 2002) Vol. 41, No. 7A, pp. L742-L744.
Publisher: INST PURE APPLIED PHYSICS, DAINI TOYOKAIJI BLDG, 4-24-8 SHINBASHI, MINATO-KU TOKYO, 105-004, JAPAN.
ISSN: 0021-4922.
DOCUMENT TYPE: Article; Journal
LANGUAGE: English
REFERENCE COUNT: 15
ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

AB A new atomic force microscopy (AFM) technique, called point-contact current-imaging AFM (PCI-AFM)-which combines tapping mode (for mapping topographic image) and point-contact operation (for measuring current-voltage characteristics)-has been developed. This new AFM technique can simultaneously map high-resolution topographic image and measure spatially resolved I-V characteristics of materials (placed on an insulative substrate and connected to a gold electrode) on the nanoscale. The high performance of the PCI-AFM system was evaluated in experiments on **single-walled carbon nanotubes** (**SWNTs**).

L22 ANSWER 9 OF 24 SCISEARCH COPYRIGHT 2003 ISI (R) DUPLICATE 1
ACCESSION NUMBER: 2002:556641 SCISEARCH
THE GENUINE ARTICLE: 568NU
TITLE: Scanning force microscopy three-dimensional modes applied to the study of the dielectric response of adsorbed **DNA** molecules
AUTHOR: Gomez-Navarro C (Reprint); Gil A; Alvarez M; De Pablo P J; Moreno-Herrero F; Horcas I; Fernandez-Sanchez R; Colchero J; Gomez-Herrero J; Baro A M
CORPORATE SOURCE: Univ Autonoma Madrid, Dept Fis Mat Condensada, Lab Nuevas Microscopias, E-28049 Madrid, Spain (Reprint); Nanotec Elect SL, E-28036 Madrid, Spain
COUNTRY OF AUTHOR: Spain
SOURCE: NANOTECHNOLOGY, (JUN 2002) Vol. 13, No. 3, pp. 314-317.
Publisher: IOP PUBLISHING LTD, DIRAC HOUSE, TEMPLE BACK, BRISTOL BS1 6BE, ENGLAND.
ISSN: 0957-4484.
DOCUMENT TYPE: Article; Journal
LANGUAGE: English
REFERENCE COUNT: 17
ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

AB We have developed a set of working modes for scanning

probe microscopy (SPM), which generalizes the usual method of acquiring data. We call these modes three-dimensional (3D) modes. Using these modes it is possible to measure typical SPM magnitudes, such as, for example, the tunnel current, the normal force and the amplitude or frequency of the cantilever oscillation, as a function of any other two magnitudes of the system: f(x(1), x(2)). In this paper we present different examples of 3D modes. In particular, we have applied 3D modes to the study of the electrostatic interaction of co-adsorbed **single walled carbon nanotubes** and individual **DNA** molecules with a metallic scanning force microscopy tip. The data indicate that adsorbed **DNA** has a dielectric constant similar to that of the glass substrate.

L22 ANSWER 10 OF 24 SCISEARCH COPYRIGHT 2003 ISI (R) DUPLICATE 2
ACCESSION NUMBER: 2002:300149 SCISEARCH
THE GENUINE ARTICLE: 535JF
TITLE: Scanned conductance microscopy of **carbon nanotubes** and lambda-**DNA**
AUTHOR: Bockrath M (Reprint); Markovic N; Shepard A; Tinkham M; Gurevich L; Kouwenhoven L P; Wu M S W; Sohn L L
CORPORATE SOURCE: Harvard Univ, Dept Phys, 9 Oxford St, Cambridge, MA 02138 USA (Reprint); Harvard Univ, Dept Phys, Cambridge, MA 02138 USA; Delft Univ Technol, Dept Appl Phys, NL-2600 GA Delft, Netherlands; Delft Univ Technol, DIMES, NL-2600 GA Delft, Netherlands; Princeton Univ, Dept Phys, Princeton, NJ 08544 USA
COUNTRY OF AUTHOR: USA; Netherlands
SOURCE: NANO LETTERS, (MAR 2002) Vol. 2, No. 3, pp. 187-190. Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036 USA. ISSN: 1530-6984.
DOCUMENT TYPE: Article; Journal
LANGUAGE: English
REFERENCE COUNT: 16
ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

AB We have devised a scanned **probe** technique based on electrostatic force microscopy capable of probing the conductance of samples without requiring attached leads. We demonstrate that, using our technique, conductance can be probed on length scales as small as 0.4 mum. To demonstrate the utility of our technique, we use it to **probe** the conductance of **DNA**, a subject that has been the focus of intense debate with reported results ranging from metallic to insulating. In contrast to conducting **single-wall carbon nanotubes**, used as a control, individual strands of lambda-**DNA**, a widely studied sequence, are found to be insulating on the length scale probed.

L22 ANSWER 11 OF 24 JICST-EPlus COPYRIGHT 2003 JST
ACCESSION NUMBER: 1020211723 JICST-EPlus
TITLE: **Single Wall Carbon Nanotube** Cantilever: Fabrication and Application.
AUTHOR: GOTO YOSHITAKA; MATSUMOTO KAZUHIKO YASUTAKE MASATOSHI; MURAMATSU HIROSHI KIM J-M
CORPORATE SOURCE: National Inst. Advanced Industrial Sci. and Technol.

Seiko Insutsurumentsu
Shokuhinsogoken
SOURCE: Hyomen Kagaku (Journal of the Surface Science Society of Japan), (2002) vol. 23, no. 2, pp. 116-122.
Journal Code: F0940B (Fig. 10, Ref. 11)
ISSN: 0388-5321
PUB. COUNTRY: Japan
DOCUMENT TYPE: Journal; Article
LANGUAGE: Japanese
STATUS: New

AB A **single wall carbon nanotube** (**SWNT**) has an extremely small diameter of 1-2nm and a high aspect ratio. For the use of the **SWNT** as an atomic force microscopy (AFM) cantilever, the **SWNT** was grown directly onto the top of the conventional silicon (Si) AFM cantilever using chemical vapor deposition (CVD) at 900.DEG.C. in flowing CH4 gas. The length of the **SWNT** was hardly controlled in the growing process. Therefore, we cut the **SWNT** and adjusted its length at the top of the cantilever by bending and by applying the bias between the cantilever and the conductive substrate with monitoring the force curve and the vibration amplitude of the cantilever. The resolution of AFM using the optimized **SWNT** cantilever was compared with the one using conventional Si cantilever by observing the Au surface and TiOX lines fabricated utilizing the AFM nano-oxidation process. The radius of the **SWNT** cantilever was estimated by observing the width of the **DNA** in air. (author abst.)

L22 ANSWER 12 OF 24 PROMT COPYRIGHT 2003 Gale Group

ACCESSION NUMBER: 2001:670620 PROMT
TITLE: Jefferson Lab's FEL gets down to business.
AUTHOR(S): Dylla, H. Frederick
SOURCE: Laser Focus World, (August 2001) Vol. 37, No. 8, pp. 93.
ISSN: 1043-8092.
PUBLISHER: PennWell Publishing Co.
DOCUMENT TYPE: Newsletter
LANGUAGE: English
WORD COUNT: 1597
FULL TEXT IS AVAILABLE IN THE ALL FORMAT

AB Two years after becoming the world's most powerful tunable laser and enabling numerous research experiments, upgrades are planned for Jefferson Lab's free-electron laser.

L22 ANSWER 13 OF 24 PROMT COPYRIGHT 2003 Gale Group

ACCESSION NUMBER: 2001:473100 PROMT
TITLE: BAD CHEMISTRY.(Science magazine and online publishing)(Statistical Data Included)
AUTHOR(S): HAGAN, JOE
SOURCE: Folio: the Magazine for Magazine Management, (1 Jun 2001) Vol. 30, No. 7, pp. 40.
ISSN: 0046-4333.

PUBLISHER: Intertec Publishing Corporation, A PRIMEDIA Co.
DOCUMENT TYPE: Newsletter
LANGUAGE: English
WORD COUNT: 2073
FULL TEXT IS AVAILABLE IN THE ALL FORMAT

AB SCIENCES AMBITIOUS WEB PLANS HERALDED A NEW ERA FOR THE INFLUENTIAL NONPROFIT. BUT THAT WAS BEFORE ITS PUBLIC SERVICE MANDATE RAN SMACK INTO ITS BOTTOM LINE. A TALE OF POLITICS, TECHNOLOGY AND MISSION CREEP.

Subscription: $96.00 per year. Published semimonthly. P.O. Box 470, Mt. Morris, IL 61054.

L22 ANSWER 14 OF 24 WPIDS (C) 2003 THOMSON DERWENT
ACCESSION NUMBER: 2001-522096 [57] WPIDS
DOC. NO. NON-CPI: N2001-386946
DOC. NO. CPI: C2001-155805
TITLE: Sensor for detecting analyte in fluid, is electrically connected to electrical measuring apparatus, and comprises layer comprising conductive modified particles.
DERWENT CLASS: A89 B04 D16 J04 S03
INVENTOR(S): GALLOWAY, C P; MUNOZ, B C; PIERCE, K J
PATENT ASSIGNEE(S): (CABO) CABOT CORP; (CYRA-N) CYRANO SCI INC
COUNTRY COUNT: 93
PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
WO 2001050117	A1	20010712	(200157)*	EN	59
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW					
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW					
AU 2001027438	A	20010716	(200169)		
EP 1244906	A1	20021002	(200265)	EN	
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR					

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
WO 2001050117	A1	WO 2000-US35626	20001229
AU 2001027438	A	AU 2001-27438	20001229
EP 1244906	A1	EP 2000-990409	20001229
		WO 2000-US35626	20001229

FILING DETAILS:

PATENT NO	KIND	PATENT NO
AU 2001027438	A Based on	WO 200150117

EP 1244906 A1 Based on WO 200150117

PRIORITY APPLN. INFO: US 1999-173964P 19991230
AN 2001-522096 [57] WPIDS
AB WO 200150117 A UPAB: 20011005
NOVELTY - Sensor is electrically connected to an electrical measuring apparatus, and comprises a layer comprising conductive modified particles.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) arrays of sensors for detecting analyte fluid, comprising 2 or more sensors for detecting analyte in fluid, at least one sensor comprises a layer comprising conductive modified particle; and

(2) method for detecting the presence of analyte in fluid, involves contacting sensor arrays with analyte to generate response and detecting the response using detector which is operatively associated with each sensor, each sensor has an electrical path.

USE - For analyte applications for detecting broad range of chemicals such as alkanes, alkenes, alkynes, dienes, alicyclic hydrocarbons, arenes, heterocyclic alcohols, ethers, ketones, aldehydes, carbonyls, carbanions, polynuclear aromatics and their organic such as halide derivative. Sensor array is used in biomedicine, environmental toxicology and remediation for monitoring ambient air in heavy industrial manufacturing such as automotive and aircrafts, worker protecting, emission control, product quality testing in oil/gas petrochemical applications, such as combustible gas protection, hydrogen sulfide monitoring and hazardous leak detection and identification, emergency response and law enforcement applications such as illegal substance detection and identification, arson investigation, hazardous spill identification, enclosed space survey, and explosive detection, utility and power application such as emission monitoring and transformer fault detection, food/beverage/agricultural applications such as freshness detection, fruit ripening control, fermentation process monitoring and control, flavor composition and identification, product quality and identification, and refrigerant and fumigant detection, cosmetic/perfume application such as fragrance formulation, product quality testing and patent protection fingerprinting, chemical/plastics/pharmaceutical application such as fugitive emission identification, leak detection, solvent recovery effectiveness, perimeter monitory and product quality testing, hazardous waste site applications such as perimeter monitoring, transportation applications such as hazardous spill monitoring, refueling operation, shipping container inspection, and diesel/gasoline/aviation fuel identification; building applications such as natural gas detection, formaldehyde detection, smoke detection, automatic ventilation control and air intake monitoring, and medical/hospital applications such as anesthesia and sterilizing gas detection, infectious disease detection, telesurgery, breath, wound and body fluid analysis.

ADVANTAGE - The sensor avoids the use of non-conducting polymer. The sensor is highly sensitive towards a variety of different analytes when compared to conventional sensors, hence can lead to greater change in resistance for a given level of vapor emitted by analyte, thus leading to better discrimination value between various sensors. The sensor has reduced thickness and response time. The sensor provides highly linear relationship towards analyte concentration, temperature and humidity conditions,

this enables the sensor to respond consistently and predictably to variance that occur with respect to these parameters. Uniform dispersion can be formed using modified particles hence a layer containing uniformly dispersed particle can be formed which enables to obtain better response. The sensor is simple, and can be economically manufactured by one step spraying process using excellent suspension and dispersion of modified particles. The sensor excels in discrimination power towards variety of analytes hence properly and accurately detects analyte and/or analyte concentration.
Dwg.0/3

L22 ANSWER 15 OF 24 SCISEARCH COPYRIGHT 2003 ISI (R) DUPLICATE 3
ACCESSION NUMBER: 2001:323132 SCISEARCH
THE GENUINE ARTICLE: 419AW
TITLE: Dissolution of full-length single-walled **carbon nanotubes**
AUTHOR: Chen J; Rao A M; Lyuksyutov S; Itkis M E; Hamon M A; Hu H; Cohn R W; Eklund P C; Colbert D T; Smalley R E; Haddon R C (Reprint)
CORPORATE SOURCE: Univ Kentucky, Adv Carbon Mat Ctr, Dept Chem, Lexington, KY 40506 USA (Reprint); Univ Kentucky, Adv Carbon Mat Ctr, Dept Phys, Lexington, KY 40506 USA; Univ Kentucky, Carbon Solut Inc, Lexington, KY 40506 USA; Univ Louisville, Electroopt Res Inst, Louisville, KY 40292 USA; Rice Univ, Dept Chem & Phys, Ctr Nanoscale Sci & Technol, Houston, TX 77251 USA
COUNTRY OF AUTHOR: USA
SOURCE: JOURNAL OF PHYSICAL CHEMISTRY B, (5 APR 2001) Vol. 105, No. 13, pp. 2525-2528.
Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036 USA.
ISSN: 1089-5647.
DOCUMENT TYPE: Article; Journal
LANGUAGE: English
REFERENCE COUNT: 26
ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

AB Full-length **single**-walled **carbon nanotubes** (**SWNTs**) were rendered soluble in common organic solvents by noncovalent (ionic) functionalization of the carboxylic acid groups present in the purified **SWNTs**. Atomic force microscopy (AFM) showed that the majority of the **SWNTs** ropes were exfoliated into small ropes (2-5 nm in diameter) and individual **nanotubes** with lengths of several micrometers during the dissolution process. The combination of multiwavelength laser excitation Raman scattering spectroscopy and solution-phase visible and near-infrared spectroscopies was used to characterize the **library** of **SWNTs** that is produced in current preparations. The average diameter of metallic **nanotubes** was found by Raman spectroscopy to be smaller than that of semiconducting **nanotubes** in the various types of full-length **SWNT** preparations. This observation sheds new light on the mechanism of **SWNT** formation.

L22 ANSWER 16 OF 24 SCISEARCH COPYRIGHT 2003 ISI (R) DUPLICATE 4
ACCESSION NUMBER: 2001:106830 SCISEARCH
THE GENUINE ARTICLE: 394HZ

TITLE: Combinatorial optimization of heterogeneous catalysts used in the growth of **carbon nanotubes**

AUTHOR: Cassell A M (Reprint); Verma S; Delzeit L; Meyyappan M; Han J

CORPORATE SOURCE: Eloret Corp, Sunnyvale, CA 94087 USA (Reprint); NASA, Ames Res Ctr, Moffett Field, CA 94035 USA

COUNTRY OF AUTHOR: USA

SOURCE: LANGMUIR, (23 JAN 2001) Vol. 17, No. 2, pp. 260-264. Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036 USA. ISSN: 0743-7463.

DOCUMENT TYPE: Letter; Journal

LANGUAGE: English

REFERENCE COUNT: 15

ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

AB **Libraries** of liquid-phase catalyst precursor solutions were printed onto iridium-coated silicon substrates and evaluated for their effectiveness in catalyzing the growth of multiwalled **carbon nanotubes** (MWNTs) by chemical vapor deposition (CVD). The catalyst precursor solutions were composed of inorganic salts and a removable triblock copolymer (EO)(20)(PO)(70)(EO)(20) (EO = ethylene oxide, PO = propylene oxide) structure-directing agent (SDA), dissolved in ethanol/methanol mixtures. Sample **libraries** were quickly assayed using scanning electron microscopy after CVD growth to identify active catalysts and CVD conditions. Composition **libraries** and focus **libraries** were then constructed around the active spots identified in the discovery **libraries** to understand how catalyst precursor composition affects the yield, density, and quality of the **nanotubes**. Successful implementation of combinatorial optimization methods in the development of highly active, **carbon nanotube** catalysts is demonstrated, as well as the identification of catalyst formulations that lead to varying densities and shapes of aligned **nanotube** towers.

L22 ANSWER 17 OF 24 MEDLINE DUPLICATE 5

ACCESSION NUMBER: 2001427623 MEDLINE

DOCUMENT NUMBER: 21368164 PubMed ID: 11473787

TITLE: Structural and functional imaging with **carbon nanotube** AFM **probes**.

AUTHOR: Hafner J H; Cheung C L; Woolley A T; Lieber C M

CORPORATE SOURCE: Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA 02138, USA.

SOURCE: PROGRESS IN BIOPHYSICS AND MOLECULAR BIOLOGY, (2001) 77 (1) 73-110. Ref: 111
Journal code: 0401233. ISSN: 0079-6107.

PUB. COUNTRY: England: United Kingdom

DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
General Review; (REVIEW)
(REVIEW, ACADEMIC)

LANGUAGE: English

FILE SEGMENT: Priority Journals

ENTRY MONTH: 200110

ENTRY DATE: Entered STN: 20011008
Last Updated on STN: 20011008
Entered Medline: 20011004

AB Atomic force microscopy (AFM) has great potential as a tool for structural biology, a field in which there is increasing demand to characterize larger and more complex biomolecular systems. However, the poorly characterized silicon and silicon nitride **probe** tips currently employed in AFM limit its biological applications. **Carbon nanotubes** represent ideal AFM tip materials due to their small diameter, high aspect ratio, large Young's modulus, mechanical robustness, well-defined structure, and unique chemical properties. **Nanotube probes** were first fabricated by manual assembly, but more recent methods based on chemical vapor deposition provide higher resolution **probes** and are geared towards mass production, including recent developments that enable quantitative preparation of individual **single-walled carbon nanotube** tips [J. Phys. Chem. B 105 (2001) 743]. The high-resolution imaging capabilities of these **nanotube** AFM **probes** have been demonstrated on gold nanoparticles and well-characterized biomolecules such as IgG and GroES. Using the **nanotube probes**, new biological structures have been investigated in the areas of amyloid-beta **protein** aggregation and chromatin remodeling, and new biotechnologies have been developed such as AFM-based haplotyping. In addition to measuring topography, chemically functionalized AFM **probes** can measure the spatial arrangement of chemical functional groups in a sample. However, standard silicon and silicon nitride tips, once functionalized, do not yield sufficient resolution to allow combined structural and functional imaging of biomolecules. The unique end-group chemistry of **carbon nanotubes**, which can be arbitrarily modified by established chemical methods, has been exploited for chemical force microscopy, allowing single-molecule measurements with well-defined functionalized tips.

L22 ANSWER 18 OF 24 PROMT COPYRIGHT 2003 Gale Group

ACCESSION NUMBER: 2000:683060 PROMT
TITLE: Sitefinder and Links.(Directory)
SOURCE: PC Magazine, (8 Aug 2000) pp. 133.
ISSN: 0888-8507.
PUBLISHER: Ziff-Davis Publishing Company
DOCUMENT TYPE: Newsletter
LANGUAGE: English
WORD COUNT: 1263
FULL TEXT IS AVAILABLE IN THE ALL FORMAT

AB Related Links
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Subscription: $50.00 per year. Published semimonthly. P.O. Box 54093, Boulder, CO 80322.

L22 ANSWER 19 OF 24 PROMT COPYRIGHT 2003 Gale Group

ACCESSION NUMBER: 2001:18947 PROMT
TITLE: supplier listings.
SOURCE: Paint & Coatings Industry, (Dec 2000) Vol. 16, No. 12, pp. 114.
ISSN: 0884-3848.
PUBLISHER: Business News Publishing Co.
DOCUMENT TYPE: Newsletter

LANGUAGE: English
WORD COUNT: 49620
FULL TEXT IS AVAILABLE IN THE ALL FORMAT

AB A&C Catalysts Inc.
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Subscription: $44.00 per year. Published monthly. 755 West Big Beaver Road, P.O. Box 4270 (48099), Troy, MI 48099.

L22 ANSWER 20 OF 24 PROMT COPYRIGHT 2003 Gale Group

ACCESSION NUMBER: 2001:1212 PROMT
TITLE: On guard!(researchers use nano-weapons to destroy disease-causing microbes)(Industry Overview)
AUTHOR(S): Gura, Trisha
SOURCE: New Scientist, (2 Dec 2000) Vol. 168, No. 2267, pp. 25.
ISSN: 0262-4079.
PUBLISHER: Reed Elsevier Business Publishing, Ltd.
DOCUMENT TYPE: Newsletter
LANGUAGE: English
WORD COUNT: 2256
FULL TEXT IS AVAILABLE IN THE ALL FORMAT

AB More and more microbes are treating our chemical weapons with disdain. But they won't find it so easy to resist the thrust of this man's molecular rapiers.
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L22 ANSWER 21 OF 24 PROMT COPYRIGHT 2003 Gale Group

ACCESSION NUMBER: 2000:565068 PROMT
TITLE: NASA SAMPE 2000 KEYNOTE PANEL.(Brief Article)
SOURCE: Advanced Materials & Composites News, (3 Jul 2000) Vol. 22, No. 496.
PUBLISHER: Composites Worldwide, Inc.
DOCUMENT TYPE: Newsletter
LANGUAGE: English
WORD COUNT: 281
FULL TEXT IS AVAILABLE IN THE ALL FORMAT

AB Dr. Darrel Tenney, Director of NASA's Aerospace Vehicle Systems Technology Program, NASA Langley, spoke on "Dealing with Complexity in the 21st Century." There will be a revolution in materials technology over the next 10 to 20 years.
THIS IS THE FULL TEXT: COPYRIGHT 2000 Composites Worldwide, Inc.

Subscription: $487.00 per year. Published semimonthly. 991 Lomas Santa Fe Drive, Solana Beach, CA 92075-2125.

L22 ANSWER 22 OF 24 MEDLINE DUPLICATE 6
ACCESSION NUMBER: 2000226014 MEDLINE
DOCUMENT NUMBER: 20226014 PubMed ID: 10737761
TITLE: **Carbon nanotube** atomic force microscopy tips: direct growth by chemical vapor deposition and application to high-resolution imaging.

AUTHOR: Cheung C L; Hafner J H; Lieber C M
CORPORATE SOURCE: Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA 02138, USA.
SOURCE: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, (2000 Apr 11) 97 (8) 3809-13.
Journal code: 7505876. ISSN: 0027-8424.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200005
ENTRY DATE: Entered STN: 20000525
Last Updated on STN: 20000525
Entered Medline: 20000517

AB **Carbon nanotubes** are potentially ideal atomic force microscopy **probes** because they can have diameters as small as one nanometer, have robust mechanical properties, and can be specifically functionalized with chemical and biological **probes** at the tip ends. This communication describes methods for the direct growth of **carbon nanotube** tips by chemical vapor deposition (CVD) using ethylene and iron catalysts deposited on commercial silicon-cantilever-tip assemblies. Scanning electron microscopy and transmission electron microscopy measurements demonstrate that multiwalled **nanotube** and **single-walled nanotube** tips can be grown by predictable variations in the CVD growth conditions. Force-displacement measurements made on the tips show that they buckle elastically and have very small (</= 100 pN) nonspecific adhesion on mica surfaces in air. Analysis of images recorded on gold nanoparticle standards shows that these multi- and **single-walled carbon nanotube** tips have radii of curvature of 3-6 and 2-4 nm, respectively. Moreover, the **nanotube** tip radii determined from the nanoparticle images are consistent with those determined directly by transmission electron microscopy imaging of the **nanotube** ends. These molecular-scale CVD **nanotube probes** have been used to image isolated IgG and GroES **proteins** at high-resolution.

L22 ANSWER 23 OF 24 MEDLINE DUPLICATE 7
ACCESSION NUMBER: 2000470716 MEDLINE
DOCUMENT NUMBER: 20347558 PubMed ID: 10888845
TITLE: Direct haplotyping of kilobase-size **DNA** using **carbon nanotube probes**.
COMMENT: Comment in: Nat Biotechnol. 2000 Jul;18(7):713
AUTHOR: Woolley A T; Guillemette C; Li Cheung C; Housman D E; Lieber C M
CORPORATE SOURCE: Department of Chemistry and Chemical Biology, Harvard University, 12 Oxford Street, Cambridge, MA 02138, USA.
SOURCE: NATURE BIOTECHNOLOGY, (2000 Jul) 18 (7) 760-3.
Journal code: 9604648. ISSN: 1087-0156.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals

ENTRY MONTH: 200010
ENTRY DATE: Entered STN: 20001012
Last Updated on STN: 20001012
Entered Medline: 20001005

AB We have implemented a method for multiplexed detection of polymorphic sites and direct determination of haplotypes in 10-kilobase-size **DNA** fragments using **single-walled carbon nanotube** (**SWNT**) atomic force microscopy (AFM) **probes. Labeled oligonucleotides** are hybridized specifically to complementary target sequences in template **DNA**, and the positions of the tagged sequences are detected by direct **SWNT** tip imaging. We demonstrated this concept by detecting streptavidin and IRD800 **labels** at two different sequences in M13mp18. Our approach also permits haplotype determination from simple visual inspection of AFM images of individual **DNA** molecules, which we have done on UGT1A7, a gene under study as a cancer risk factor. The haplotypes of individuals heterozygous at two critical loci, which together influence cancer risk, can be easily and directly distinguished from AFM images. The application of this technique to haplotyping in population-based genetic disease studies and other genomic screening problems is discussed.

L22 ANSWER 24 OF 24 SCISEARCH COPYRIGHT 2003 ISI (R) DUPLICATE 8
ACCESSION NUMBER: 1998:944762 SCISEARCH
THE GENUINE ARTICLE: 146MJ
TITLE: **Single-walled carbon nanotube probes** for high-resolution nanostructure imaging
AUTHOR: Wong S S (Reprint); Woolley A T; Odom T W; Huang J L; Kim P; Vezenov D V; Lieber C M
CORPORATE SOURCE: HARVARD UNIV, DEPT CHEM & BIOL CHEM, 12 OXFORD ST, CAMBRIDGE, MA 02138 (Reprint); HARVARD UNIV, DIV ENGN & APPL SCI, CAMBRIDGE, MA 02138
COUNTRY OF AUTHOR: USA
SOURCE: APPLIED PHYSICS LETTERS, (7 DEC 1998) Vol. 73, No. 23, pp. 3465-3467.
Publisher: AMER INST PHYSICS, CIRCULATION FULFILLMENT DIV, 500 SUNNYSIDE BLVD, WOODBURY, NY 11797-2999.
ISSN: 0003-6951.
DOCUMENT TYPE: Article; Journal
FILE SEGMENT: PHYS
LANGUAGE: English
REFERENCE COUNT: 22
ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

AB **Single-walled carbon nanotube** (**SWNT**) tips have been used to image nanostructures with high resolution. Studies of gold nanocrystal standards showed that **SWNT** tips provide a significant improvement in lateral resolution with respect to multi-walled **nanotube** tips and microfabricated Si tips. The **nanotube** tips were also used to resolve substructure within **SWNTs** deposited on surfaces. These results suggest that observed 1.5 nm high structures can correspond to several **SWNTs** aligned in parallel. In addition, **SWNT** tips exhibited superior resolution compared to conventional tips when imaging biological nanostructures, such as double-stranded

DNA. The potential and future challenges of **SWNT** tips are discussed. (C) 1998 American Institute of Physics. [S0003-6951(98)03149-0].

(FILE 'HCAPLUS, MEDLINE, BIOSIS, EMBASE, WPIDS, CONFSCI, SCISEARCH, JICST-EPLUS, JAPIO, PROMT, COMPENDEX, INSPEC' ENTERED AT 15:00:13 ON 08 JAN 2003)

L23 118 S HANNAH E?/AU
L24 0 S L23 AND (L5 OR L10)
L25 0 S L23 AND (NANOTUB? OR NANO TUBE)

FILE 'HOME' ENTERED AT 15:03:21 ON 08 JAN 2003

Iran, M.
09/991610

08jan03 14:30:16 User219783 Session D1903.3

SYSTEM:OS - DIALOG OneSearch
File 144:Pascal 1973-2002/Dec W4
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File 348:EUROPEAN PATENTS 1978-2002/Dec W03
(c) 2002 European Patent Office
File 99:Wilson Appl. Sci & Tech Abs 1983-2002/Nov
(c) 2002 The HW Wilson Co.
File 98:General Sci Abs/Full-Text 1984-2002/Nov
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File 315:ChemEng & Biotec Abs 1970-2003/Dec
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-key terms

Set Items Description
S1 6790 (NANOTUB? OR NANO(W)TUBE? ?) AND (SIC OR (SILICON OR SI)(W-)(C OR CARBIDE) OR CARBON)
S2 12 S1 AND LIBRAR?
S3 425 S1 AND PROBE? ?
S4 37 S3 AND (OLIGONUCLEOTIDE? ? OR NUCLEOTIDE? ? OR PEPTIDE? ? - OR NUCLEIC OR DNA OR DEOXYRIBONUCLEIC OR DEOXY(W)RIBONUCLEIC - OR LIGAND? ?)
S5 46 S2 OR S4
S6 39 RD (unique items)

6/3,AB/1 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal
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15745511 PASCAL No.: 02-0457225
Heterogeneous single-walled *carbon"** *nanotube"** catalyst discovery and optimization
BIN CHEN; PARKER Goldwyn II; JIE HAN; MEYYAPPAN M; CASSELL Alan M
Center For Nanotechnology, National Aeronautics and Space Administration, Ames Research Center, Moffett Field, California 94035, United States
Journal: Chemistry of materials, 2002, 14 (4) 1891-1896
Language: English
High-throughput methods are utilized in the discovery and optimization of heterogeneous catalyst formulations that promote single-walled *carbon"** *nanotube"** (SWNT) synthesis. Catalyst compositions, substrates, and reaction conditions are varied to efficiently investigate SWNT growth by chemical vapor deposition (CVD). A robotic microarray printer is employed to print *libraries"** of the liquid-based catalyst precursors onto various substrates. After CVD, the catalyst arrays are qualitatively screened for yield via electron microscopy. More comprehensive characterization of candidate catalysts is further investigated with confocal Raman spectroscopy (CRS). Detailed CRS mapping reveals information concerning the printed catalyst and *nanotube"** homogeneity in the microarrays. This powerful characterization approach allows for the high-throughput screening of *nanotube"** type, diameter distribution, and purity within the microarrays. The methodology described has enabled the efficient exploration of synthesis parameters, which has led to the identification of

SWNT catalysts with various activities.

6/3,AB/2 (Item 2 from file: 144)
DIALOG(R)File 144:Pascal

15702878 PASCAL No.: 02-0411515
Coulomb blockade and the Kondo effect in single-atom transistors
JIWOONG PARK; PASUPATHY Abhay N; GOLDSMITH Jonas I; CHANG Connie; YAISH Yuval; PETTA Jason R; RINKOSKI Marie; SETHNA James P; ABRUNA Hector D; MCEUEN Paul L; RALPH Daniel C
Laboratory of Atomic and Solid State Physics, Cornell University, Ithaca, New York 14853, United States; Department of Physics, University of California, Berkeley, California 94720, United States; Department of Chemistry and Chemical Biology, Cornell University, Ithaca, New York 14853, United States
Journal: Nature : (London), 2002, 417 (6890) 722-725
Language: English
Using molecules as electronic components is a powerful new direction in the science and technology of nanometre-scale systems'. Experiments to date have examined a multitude of molecules conducting in parallel SUP 2 SUP , SUP 3 , or, in some cases, transport through single molecules. The latter includes molecules *probed"** in a two-terminal geometry using mechanically controlled break junctions SUP 4 SUP , SUP 5 or scanning *probes"** SUP 6 SUP , SUP 7 as well as three-terminal single-molecule transistors made from *carbon"** *nanotubes"** SUP 8 , C SUB 6 SUB 0 molecules SUP 9 , and conjugated molecules diluted in a less-conducting molecular layer SUP 1 SUP 0 . The ultimate limit would be a device where electrons hop on to, and off from, a single atom between two contacts. Here we describe transistors incorporating a transition-metal complex designed so that electron transport occurs through well-defined charge states of a single atom. We examine two related molecules containing a Co ion bonded to polypyridyl *ligands"** , attached to insulating tethers of different lengths. Changing the length of the insulating tether alters the coupling of the ion to the electrodes, enabling the fabrication of devices that exhibit either single-electron phenomena, such as Coulomb blockade, or the Kondo effect.

6/3,AB/3 (Item 3 from file: 144)
DIALOG(R)File 144:Pascal

15367407 PASCAL No.: 02-0055288
Reduction of Long-range Interactions using *Carbon"** *Nanotube"** *Probes"** in Biological Systems
MAEDA Yasushi; NISHIJIMA Hidehiro; AKITA Seiji; MATSUMOTO Takuya; NAKAYAMA Yoshikazu; KAWAI Tomoji
The Institute of Scientific and Industrial Research, Osaka University, 8-1 Mihogaoka, Ibaraki, Osaka 567-0047, Japan; Department of Physics and Electronics, Osaka Prefecture University, 1-1 Gakuen-cho, Sakai, Osaka 599-8531, Japan
Journal: Japanese Journal of Applied Physics, Part I : Regular papers, short notes & review papers, 2001-03-15, 40 (3A) 1425-1428

Language: English

*Carbon"** *nanotubes"** (CNT) have been used as tips in non-contact atomic force microscopy (NC-AFM) to observe biomolecules including *deoxyribonucleic"** acid (*DNA"**) molecules. Adhesion and electrostatic forces, which affect NC-AFM measurements even in vacuum condition, can be drastically reduced by using a CNT tip without thermal treatments for samples. Consequently, stable imaging of *DNA"** molecules was performed under the presence of a water layer and various surface charges on the substrate. This is highly advantageous for imaging biomolecules, which are denatured easily by thermal treatment.

6/3,AB/4 (Item 4 from file: 144)
DIALOG(R)File 144:Pascal

15238532 PASCAL No.: 01-0406231

Single molecule *DNA"** device measured with triple-*probe"** atomic force microscope

WATANABE Hiroyuki; MANABE Chikara; SHIGEMATSU Taishi; SHIMOTANI Kei; SHIMIZU Masaaki

Advanced Research Laboratory, Corporate Research Center, Fuji Xerox Co., Ltd., 1600, Takematsu, Minamiashigara-shi, Kanagawa-ken, 250-0111, Japan

Journal: Applied physics letters, 2001-10-08, 79 (15) 2462-2464

Language: English

We have measured the electric properties of a three-terminal single molecule *DNA"** device with a triple-*probe"** atomic force microscope (T-AFM). The T-AFM permits us to connect a single *DNA"** molecule with *carbon"** *nanotube"** (CNT) electrodes as source, drain, and gate terminals. As the gate bias voltage is increased, the voltage gap region decreased in the current-voltage (I-V) curves. Furthermore, we can observe the clear steps in the I-V curve at crossing the *DNA"** molecule and the CNT-gate electrode with gate biased. (c) 2001 American Institute of Physics.

6/3,AB/5 (Item 5 from file: 144)
DIALOG(R)File 144:Pascal

14942908 PASCAL No.: 01-0094375

Combinatorial optimization of heterogeneous catalysts used in the growth of *carbon"** *nanotubes"**

CASSELL A M; VERMA S; DELZEIT L; MEYYAPPAN M; HAN J

Natl Aeronautics and Space Administration, Moffett Field CA, United States

Journal: Langmuir, 2001, 17 (2) 260-264

Language: English

*Libraries"** of liquid-phase catalyst precursor solutions were printed onto iridium-coated silicon substrates and evaluated for their effectiveness in catalyzing the growth of multiwalled *carbon"** *nanotubes"** (MWNTs) by chemical vapor deposition (CVD). The catalyst precursor solutions were composed of inorganic salts and a removable triblock copolymer (EO)20(PO)70(EO)20 (EO = ethylene oxide, PO = propylene oxide) structure-directing agent (SDA), dissolved in ethanol/methanol

mixtures. Sample *libraries"** were quickly assayed using scanning electron microscopy after CVD growth to identify active catalysts and CVD conditions. Composition *libraries"** and focus *libraries"** were then constructed around the active spots identified in the discovery *libraries"** to understand how catalyst precursor composition affects the yield, density, and quality of the *nanotubes"**. Successful implementation of combinatorial optimization methods in the development of highly active, *carbon"** *nanotube"** catalysts is demonstrated, as well as the identification of catalyst formulations that lead to varying densities and shapes of aligned *nanotube"** towers.

6/3,AB/6 (Item 6 from file: 144)
DIALOG(R)File 144:Pascal

14704857 PASCAL No.: 00-0380232
Direct haplotyping of kilobase-size *DNA"** using *carbon"** *nanotube"** *probes"**
WOOLLEY A T; GUILLEMETTE C; CHEUNG C L; HOUSMAN D E; LIEBER C M
Department of Chemistry and Chemical Biology, Harvard University, 12 Oxford Street, Cambridge, MA 02138, United States; Center for Cancer Research, Massachusetts Institute of Technology, Cambridge, MA 02139, United States
Journal: Nature biotechnology, 2000, 18 (7) 760-763
Language: English
We have implemented a method for multiplexed detection of polymorphic sites and direct determination of haplotypes in 10-kilobase-size *DNA"** fragments using single-walled *carbon"** *nanotube"** (SWNT) atomic force microscopy (AFM) *probes"**, Labeled *oligonucleotides"** are hybridized specifically to complementary target sequences in template *DNA"**, and the positions of the tagged sequences are detected by direct SWNT tip imaging. We demonstrated this concept by detecting streptavidin and IRD800 labels at two different sequences in M13mp18. Our approach also permits haplotype determination from simple visual inspection of AFM images of individual *DNA"** molecules, which we have done on UGT1A7, a gene under study as a cancer risk factor. The haplotypes of individuals heterozygous at two critical loci, which together influence cancer risk, can be easily and directly distinguished from AFM images. The application of this technique to haplotyping in population-based genetic disease studies and other genomic screening problems is discussed.

6/3,AB/7 (Item 7 from file: 144)
DIALOG(R)File 144:Pascal

14492504 PASCAL No.: 00-0155200
Microprocess for fabricating *carbon"**-*nanotube"** *probes"** of a scanning *probe"** microscope
NAKAYAMA Yoshikazu; NISHIJIMA Hidehiro; AKITA Seiji; HOHMURA Ken I; YOSHIMURA Shige H; TAKEYASU Kunio
Department of Physics and Electronics, Osaka Prefecture University, Osaka 599-8531, Japan; Graduate School of Biostudies, Kyoto University, Kyoto 606-8501, Japan
Journal: Journal of vacuum science & technology. B. Microelectronics and

nanometer structures. Processing, measurement and phenomena, 2000-03, 18 (2) 661-664
Language: English
We have developed microprocesses to make *carbon"**-*nanotube"** *probes"** for a scanning *probe"** microscope. The processes contain electric-field induced transportation, welding and fixation by electron-beam *carbon"** deposition and are performed in a scanning electron microscope equipped with two individual manipulable stages. Using the *nanotube"** *probes"** produced, a fine structure of helical and twinned *deoxyribonucleic"** acid and an abrupt height transition with high fidelity in a 4.7 GB digital versatile disk are imaged with tapping-mode atomic force microscopy in air. (c) 2000 American Vacuum Society.

6/3,AB/8 (Item 8 from file: 144)
DIALOG(R)File 144:Pascal

14138262 PASCAL No.: 99-0334851
*Carbon"** *nanotube"** tips for a scanning *probe"** microscope : their fabrication and properties
AKITA S; NISHIJIMA H; NAKAYAMA Y; TOKUMASU F; TAKEYASU K
Department of Physics and Electronics, Osaka Prefecture University, 1-1 Gakuen-cho, Sakai, Osaka 599-8531, Japan; Department of Natural Environment Sciences, Faculty of Integrated Human Studies, Kyoto University, Yoshida-Nihonmatsu-cho, Sakyo-ku, Kyoto 606-8501, Japan
Journal: Journal of physics. D. Applied physics, 1999, 32 (9) 1044-1048
Language: English
We report a well controlled method to make *carbon"** *nanotube"** tips for a scanning *probe"** microscope (SPM). A multiwalled *carbon"** *nanotube"**, which is purified by the electrophoresis, is transferred onto a conventional Si tip for a SPM using a scanning electron microscope (SEM) equipped with two independent specimen stages. The *nanotube"** is fixed on the Si tip by electron beam deposition of *carbon"**. A force curve measurement of *nanotubes"** using the *nanotube"** tips in the SEM reveals that Young's modulus of a *nanotube"** of 20 nm diameter is 1. 1 TPa and the fixing of *nanotubes"** by the *carbon"** deposit is effective. The *nanotube"** tips are used to image plasmid *deoxyribonucleic"** acids on mica by tapping mode. The average resolution by using the *nanotube"** tips is about two times higher than that by the best Si tips.

6/3,AB/9 (Item 9 from file: 144)
DIALOG(R)File 144:Pascal

14088722 PASCAL No.: 99-0281912
*Carbon"**-*nanotube"** tips for scanning *probe"** microscopy: Preparation by a controlled process and observation of *deoxyribonucleic"** acid
NISHIJIMA Hidehiro; KAMO Satsuki; AKITA Seiji; NAKAYAMA Yoshikazu; HOHMURA Ken I; YOSHIMURA Shige H; TAKEYASU Kunio
Department of Physics and Electronics, Osaka Prefecture University, 1-1 Gakuen-cho, Sakai, Osaka 599-8531, Japan; Department of Natural Environment Sciences, Faculty of Integrated Human Studies, Kyoto University,

Yoshida-Nihonmatsu-cho, Sakyo-ku, Kyoto 606-8501, Japan
Journal: Applied physics letters, 1999-06-28, 74 (26) 4061-4063
Language: English
We report a controlled process to make *carbon"**-*nanotube"** tips for scanning *probe"** microscopes. The process consists of three steps: (1) purification and alignment of *carbon"** *nanotubes"** using electrophoresis, (2) transfer of a single aligned *nanotube"** onto a conventional Si tip under the view of a scanning electron microscope, and (3) attachment of the *nanotube"** on the Si tip by *carbon"** deposition. *Nanotube"** tips fabricated using this procedure exhibit strong adhesion and are mechanically robust. Finally, the performance of these tips is demonstrated by imaging the fine structure of twinned *deoxyribonucleic"** acid with tapping-mode atomic force microscopy in air. (c) 1999 American Institute of Physics.

6/3,AB/10 (Item 10 from file: 144)
DIALOG(R)File 144:Pascal

13812423 PASCAL No.: 98-0527954
Single-walled *carbon"** *nanotube"** *probes"** for high-resolution nanostructure imaging
WONG Stanislaus S; WOOLLEY Adam T; ODOM Teri Wang; HUANG Jin-Lin; KIM Philip; VEZENOV Dimitri V; LIEBER Charles M
Department of Chemistry and Chemical Biology and Division of Engineering and Applied Sciences, Harvard University, Cambridge, Massachusetts 02138
Journal: Applied physics letters, 1998-12-07, 73 (23) 3465-3467
Language: English
Single-walled *carbon"** *nanotube"** (SWNT) tips have been used to image nanostructures with high resolution. Studies of gold nanocrystal standards showed that SWNT tips provide a significant improvement in lateral resolution with respect to multi-walled *nanotube"** tips and microfabricated Si tips. The *nanotube"** tips were also used to resolve substructure within SWNTs deposited on surfaces. These results suggest that observed 1.5 nm high structures can correspond to several SWNTs aligned in parallel. In addition, SWNT tips exhibited superior resolution compared to conventional tips when imaging biological nanostructures, such as double-stranded *DNA"** . The potential and future challenges of SWNT tips are discussed. (c) 1998 American Institute of Physics.

6/3,AB/11 (Item 11 from file: 144)
DIALOG(R)File 144:Pascal

13746098 PASCAL No.: 98-0438782
Covalently functionalized *nanotubes"** as nanometre-sized *probes"** in chemistry and biology
WONG S S; JOSELEVICH E; WOOLLEY A T; CHIN LI CHEUNG; LIEBER C M
Department of Chemistry and Chemical Biology, Harvard University, 12 Oxford Street, Cambridge, Massachusetts 02138, United States
Journal: Nature : (London), 1998, 394 (6688) 52-55
Language: English
*Carbon"** *nanotubes"** combine a range of properties that make them

well suited for use as *probe"** tips in applications such as atomic force microscopy (AFM) SUP 1 SUP - SUP 3 . Their high aspect ratio, for example, opens up the possibility of probing the deep crevices SUP 4 that occur in microelectronic circuits, and the small effective radius of *nanotube"** tips significantly improves the lateral resolution beyond what can be achieved using commercial silicon tips SUP 5 . Another characteristic feature of *nanotubes"** is their ability to buckle elastically SUP 4 SUP , SUP 6 , which makes them very robust while limiting the maximum force that is applied to delicate organic and biological samples. Earlier investigations into the performance of *nanotubes"** as scanning *probe"** microscopy tips have focused on topographical imaging, but a potentially more significant issue is the question of whether *nanotubes"** can be modified to create *probes"** that can sense and manipulate matter at the molecular level SUP 7 . Here we demonstrate that *nanotube"** tips with the capability of chemical and biological discrimination can be created with acidic functionality and by coupling basic or hydrophobic functionalities or biomolecular *probes"** to the carboxyl groups that are present at the open tip ends. We have used these modified *nanotubes"** as AFM tips to titrate the acid and base groups, to image patterned samples based on molecular interactions, and to measure the binding force between single protein-*ligand"** pairs. As carboxyl groups are readily derivatized by a variety of reactions SUP 8 , the preparation of a wide range of functionalized *nanotube"** tips should be possible, thus creating molecular *probes"** with potential applications in many areas of chemistry and biology.

6/3,AB/12 (Item 1 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01513834
Improvements in or relating to contrast agents
Verbesserungen in oder an Kontrastmitteln
Ameliorations a ou en rapport aux produits de contraste
PATENT ASSIGNEE:
Amersham Health AS, (3995790), Nycoveien 1-2, PO Box 4220, Nydalen, 0401 Oslo, (NO), (Applicant designated States: all)
INVENTOR:
Ostensen, Jonny, Amersham Health AS, Nycoveien 1-2, P.O. Box 4220, Nydalen, 0401 Oslo, (NO)
Frigstad, Sigmund, Amersham Health A, Nycoveien 1-2, P.O. Box 4220, Nydalen, 0401 Oslo, (NO)
Eriksen, Morten, Amersham Health A, Nycoveien 1-2, P.O. Box 4220, Nydalen , 0401 Oslo, (NO)
Rongved, Pal, Amersham Health AS, Nycoveien 1-2, P.O. Box 4220, Nydalen, 0401 Oslo, (NO)
LEGAL REPRESENTATIVE:
Marsden, John Christopher et al (70601), Frank B. Dehn & Co., European Patent Attorneys, 179 Queen Victoria Street, London EC4V 4EL, (GB)
PATENT (CC, No, Kind, Date): EP 1264604 A2 021211 (Basic)
APPLICATION (CC, No, Date): EP 2002078777 971021;
PRIORITY (CC, No, Date): GB 9621884 961021; GB 9708239 970423
DESIGNATED STATES: AT; BE; CH; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE
EXTENDED DESIGNATED STATES: AL; LT; LV; RO; SI

RELATED PARENT NUMBER(S) - PN (AN):
EP 1007100 (EP 97909467)
INTERNATIONAL PATENT CLASS: A61K-049/00

ABSTRACT EP 1264604 A2
Combined preparations comprising an injectable gas dispersion and a coadministrable diffusible component which is capable of inward diffusion into the dispersed gas so as to promote temporary growth of the gas in vivo, the preparations being for use as contrast agents in ultrasound cardiac studies of patients who have undergone physical exercise-induced stress in order to promote vasodilatation.
ABSTRACT WORD COUNT: 59

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200250	564
SPEC A	(English)	200250	21442
Total word count - document A			22006
Total word count - document B			0
Total word count - documents A + B			22006

6/3,AB/13 (Item 2 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01444449
SCANNING TYPE *PROBE"** MICROSCOPE *PROBE"** AND METHOD OF PRODUCING THE SAME, AND A SCANNING TYPE *PROBE"** MICROSCOPE HAVING THIS *PROBE"** AND POLYMER PROCESSING METHOD USING THE SAME
ABTASTENDE RASTER-MIKROSKOP-SONDE UND VERFAHREN ZUR HERSTELLUNG DERSELBEN, SOWIE EIN RASTER-MIKROSKOP EINSCHLIESSLICH DIESER SONDE UND EIN POLYMER-VERARBEITUNGSVERFAHREN ZUR VERWENDUNG DERSELBEN
SONDE DE MICROSCOPE-SONDE A BALAYAGE, PROCEDE DE PRODUCTION DE CETTE SONDE, MICROSCOPE-SONDE A BALAYAGE POSSEDANT CETTE SONDE, ET PROCEDE DE TRAITEMENT POLYMERE FAISANT APPEL A CE MICROSCOPE-SONDE
PATENT ASSIGNEE:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza-Kadoma, Kadoma-shi, Osaka 571-8501, (JP), (Applicant designated States: all)
INVENTOR:
NAKAGAWA, Tohru, 1-6-3, Nishishibukawa, Kusatsu-shi, Shiga 525-0025, (JP)
YUKIMASA, Tetsuo, 10-1-206, Nishifunahashi 2-chome, Hirakata-shi, Osaka 573-1122, (JP)
LEGAL REPRESENTATIVE:
Marx, Lothar, Dr. et al (8071), Patentanwalte Schwabe, Sandmair, Marx Stuntzstrasse 16, 81677 Munchen, (DE)
PATENT (CC, No, Kind, Date): EP 1233259 A1 020821 (Basic)
WO 2002025246 020328
APPLICATION (CC, No, Date): EP 2001967769 010920; WO 2001JP8217 010920
PRIORITY (CC, No, Date): JP 2000286711 000921
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE; TR
INTERNATIONAL PATENT CLASS: G01N-013/16; G12B-021/08

ABSTRACT EP 1233259 A1
There is provided a *probe"** for a scanning *probe"** microscope, comprising: a proximal end; and a distal tip portion, wherein the distal

tip portion has a tip surface which faces a fixed sample, and at least one monolayer is formed at least on the tip surface, and a molecule having a chemical sensor function or catalytic function is placed in or on an outermost monolayer above the tip surface. There is provided a *probe"** for a scanning *probe"** microscope, comprising: a cover layer containing an electrically conductive polymer; and a catalyst in the cover layer, the catalyst being selected from a group consisting of inorganic catalysts and organic catalysts. There are provided a scanning *probe"** microscope equipped with the above *probe"**, and a molecule processing method using such a scanning *probe"** microscope.
ABSTRACT WORD COUNT: 133
NOTE:
Figure number on first page: 1

LANGUAGE (Publication,Procedural,Application): English; English; Japanese
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200234	1671
SPEC A	(English)	200234	13077
Total word count - document A			14748
Total word count - document B			0
Total word count - documents A + B			14748

6/3,AB/14 (Item 3 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01437078
Reflective display device
Reflektierende Anzeigevorrichtung
Dispositif d'affichage reflechissant
PATENT ASSIGNEE:
NGK INSULATORS, LTD., (302188), 2-56 Suda-cho, Mizuho-ku, Nagoya-City, Aichi Prefecture 467-8530, (JP), (Applicant designated States: all)
INVENTOR:
Takeuchi, Yukihisa, c/o NGK Insulators, Ltd., 2-56 Suda-cho, Mizuho-ku, Nagoya-city, Aichi-Pref. 467-8530, (JP)
Nanataki, Tsutomu, c/o NGK Insulators, Ltd., 2-56 Suda-cho, Mizuho-ku, Nagoya-city, Aichi-Pref. 467-8530, (JP)
Shimogawa, Natsumi, c/o NGK Insulators, Ltd., 2-56 Suda-cho, Mizuho-ku, Nagoya-city, Aichi-Pref. 467-8530, (JP)
Akao, Takayoshi, c/o NGK Insulators, Ltd., 2-56 Suda-cho, Mizuho-ku, Nagoya-city, Aichi-Pref. 467-8530, (JP)
LEGAL REPRESENTATIVE:
Paget, Hugh Charles Edward et al (34621), MEWBURN ELLIS York House 23 Kingsway, London WC2B 6HP, (GB)
PATENT (CC, No, Kind, Date): EP 1220190 A2 020703 (Basic)
APPLICATION (CC, No, Date): EP 2001310768 011221;
PRIORITY (CC, No, Date): JP 2000399508 001227; JP 2001284040 010918
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE; TR
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: G09F-009/37

ABSTRACT EP 1220190 A2
A reflective display device includes a transparent display panel (20) into which light (18) is introduced. A driving section (24) is disposed

at the back of the display panel (20). Actuator elements (22) corresponding to a number of picture elements are arranged in the driving section (24). A picture element assembly (30) is provided on each of the actuator elements (22). The picture element assembly (30) includes a light-reflecting layer (50) and a color filter (52). A light-absorptive material (14) is filled between the display panel (20) and an actuator substrate (32). The actuator elements (22) are selectively driven according to an attribute of an input image signal for controlling displacement of the picture element assembly (30) in a direction closer to or away from the display panel (20), thereby adjusting degree of light-absorption and/or light reflection between the display panel (20) and the picture element assembly (30) so that a screen image corresponding to the image signal is displayed on the display panel (20).
ABSTRACT WORD COUNT: 166
NOTE:
Figure number on first page: 1

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200227	419
SPEC A	(English)	200227	9965
Total word count - document A			10384
Total word count - document B			0
Total word count - documents A + B			10384

6/3,AB/15 (Item 4 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01095886
Electrochemical based assay processes instrument and labels
Prufverfahren, Vorrichtung und Markierungsmittel basierend auf Elektrochemie
Procedes d'essai, dispositif et marqueurs a base d'electrochimie
PATENT ASSIGNEE:
Jones, Mark Howard, (2516610), 10, residence du Parc, Avenue du Parc, 34130 Saint-Aunes, (FR), (Applicant designated States: all)
INVENTOR:
Jones, Mark Howard, 10, residence du Parc, Avenue du Parc, 34130 Saint-Aunes, (FR)
LEGAL REPRESENTATIVE:
Domange, Maxime et al (60433), Cabinet Beau de Lomenie, 232, avenue du Prado, 13295 Marseille Cedex 08, (FR)
PATENT (CC, No, Kind, Date): EP 962773 A1 991208 (Basic)
APPLICATION (CC, No, Date): EP 98430015 980603;
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: G01N-033/553
ABSTRACT EP 962773 A1
A method for quantitating or detecting an analyte using an electrochemical reaction, comprising a material in contact with an electrolyte in a cell or chamber but not in electronic contact with an external electronic circuit, at least some of said material having at least its surface conducting or semi-conducting, and applying a voltage gradient across at least a portion of said material, the size of said

material, the conductivity of said electrolyte and/or reactant liquid and the voltage gradient being such that not only are anodic and cathodic faces established in respect of at least some of the conducting or semi-conducting material, rendering said material bipolar, the electropotentials so generated are such that said electrochemical reaction takes place on at least a portion of the surfaces of said material resulting in the production of a detectable signal or detectable material. The said bipolar material which, advantageously, are spherical or fibres, may comprise solid conducting or semi-conducting material or cores of non-conducting material with coatings of conducting or non-conducting material thereon. The material, which are preferably in suspension, may also be bound or captured directly or indirectly onto a surface or filter matrix. The said surface or filter matrix if conducting is not acting as an electrode to carry out electrochemistry. The detection of the electrochemically-generated signal or material is related to the quantity or presence of said analyte.

ABSTRACT WORD COUNT: 229

NOTE:

Figure number on first page: 1

LANGUAGE (Publication,Procedural,Application): English; English; English

FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	9949	1142
SPEC A	(English)	9949	24659
Total word count - document A			25801
Total word count - document B			0
Total word count - documents A + B			25801

6/3,AB/16 (Item 5 from file: 348)

DIALOG(R)File 348:EUROPEAN PATENTS

01079250

Composition including *nanotubes"** and an organic compound

Zusammensetzung enthaltend Nanorohren und eine organische Verbindung

Composition a base de *nanotubes"** et d'un compose organique

PATENT ASSIGNEE:

Horcom Limited, (2759990), 22 Westland Row, Dublin 2, (IE), (Applicant designated States: all)

Enterprise Ireland (trading as Materials Ireland), (2760060), Wilton Park House, Wilton Place, Dublin 2, (IE), (Applicant designated States: all)

The Provost Fellows and Scholars of the College of the Holy and Undivided Trinity of Queen Elizabeth Near Dublin, (1997050), College Green, Dublin 2, (IE), (Applicant designated States: all)

INVENTOR:

Davey, Andrew, Flat No. 4, Trinity Hall, Dartry, Dublin 6, (IE)

Curran, Seamus, Coolmine, Rathcoole, County Dublin, (IE)

Blau, Werner, 2 Summerville Terrace, Dalkey Avenue, Dalkey, County Dublin , (IE)

LEGAL REPRESENTATIVE:

Schutte, Gearoid (74261), Cruickshank & Co., 1 Holles Street, Dublin 2, (IE)

PATENT (CC, No, Kind, Date): EP 949199 A1 991013 (Basic)

APPLICATION (CC, No, Date): EP 99650033 990409;

PRIORITY (CC, No, Date): IE 980272 980409

DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI;

LU; MC; NL; PT; SE
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: C01B-031/02; C08K-009/04

ABSTRACT EP 949199 A1
This invention relates to a process for purification of *nanotube"** soot in a non-destructive and efficient method using a polymer having a coiling structure to extract *nanotubes"** from their accompanying material without damage to their structure and with a high mass yield. *Nanotube"** soot is added to a solvent which including a coiling polymer to form a solution. The solution is mixed and a *nanotube"** composite suspension is formed with extraneous solid material such as amorphous *carbon"** settling at the bottom of the solution. The *nanotube"** composite suspension is decanted from the settled solid.
ABSTRACT WORD COUNT: 95
NOTE:
Figure number on first page: NONE

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	9941	260
SPEC A	(English)	9941	4204
Total word count - document A			4464
Total word count - document B			0
Total word count - documents A + B			4464

6/3,AB/17 (Item 6 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01044025
METHODS OF USING ICE-CONTROLLING MOLECULES
VERWENDUNGEN VON MOLEKULE ZUR KONTROLLE DER EISBILDUNG
UTILISATIONS DE MOLECULES CONTROLANT LA FORMATION DE GLACE
PATENT ASSIGNEE:
Life Science Holdings, Inc., (2741270), 1510 West Montana Street, Chicago, IL 60614, (US), (Proprietor designated states: all)
Organ, Inc., (2211070), 1510 West Montana Street, Chicago, IL 60614-2013, (US), (Proprietor designated states: all)
INVENTOR:
FAHY, Gregory, M., 16280 Whispering Spur, Riverside, CA 92504, (US)
LEGAL REPRESENTATIVE:
Guerre, Dominique et al (15975), Cabinet Germain et Maureau, 12, rue Boileau, BP 6153, 69466 Lyon Cedex 06, (FR)
PATENT (CC, No, Kind, Date): EP 1019458 A1 000719 (Basic)
EP 1019458 B1 020904
WO 99018169 990415
APPLICATION (CC, No, Date): EP 98952047 981002; WO 98US20834 981002
PRIORITY (CC, No, Date): US 943147 971003
DESIGNATED STATES: CH; DE; FR; GB; LI
INTERNATIONAL PATENT CLASS: C09K-003/18; A01N-001/00; A01G-015/00
NOTE:
No A-document published by EPO
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count

CLAIMS B	(English)	200236	526
CLAIMS B	(German)	200236	522
CLAIMS B	(French)	200236	602
SPEC B	(English)	200236	12312
Total word count - document A			0
Total word count - document B			13962
Total word count - documents A + B			13962

6/3,AB/18 (Item 7 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00825098
NOVEL PHYSICALLY FUNCTIONAL MATERIALS
PHYSISCH FUNKTIONELLE MATERALIEN
NOUVEAUX MATERIAUX A FONCTIONNALITES PHYSIQUES
PATENT ASSIGNEE:
Optilink AB, (2883161), Vastre Varvsgatan 10, 211 19 Malmo, (SE),
(Proprietor designated states: all)
INVENTOR:
BERG, Rolf, Henrik, Strandvaenget 6, DK-2960 Rungsted Kyst, (DK)
HVILSTED, Soren, Grundtmannsvej 4, DK-2970 Horsholm, (DK)
RAMANUJAM, P., S., AEgirsvej 5, DK-4000 Roskilde, (DK)
LEGAL REPRESENTATIVE:
Plougmann, Vingtoft & Partners A/S (101171), Sankt Annae Plads 11, P.O. Box 3007, 1021 Copenhagen K, (DK)
PATENT (CC, No, Kind, Date): EP 828709 A1 980318 (Basic)
EP 828709 B1 020918
WO 96038410 961205
APPLICATION (CC, No, Date): EP 96916021 960603; WO 96DK237 960603
PRIORITY (CC, No, Date): DK 95628 950602
DESIGNATED STATES: AT; BE; CH; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE
INTERNATIONAL PATENT CLASS: C07C-255/65; C07C-245/08; G11B-007/24
NOTE:
No A-document published by EPO
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	200238	2499
CLAIMS B	(German)	200238	2454
CLAIMS B	(French)	200238	2809
SPEC B	(English)	200238	29771
Total word count - document A			0
Total word count - document B			37533
Total word count - documents A + B			37533

6/3,AB/19 (Item 8 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00647625
USE OF FULLERENES IN DIAGNOSTIC AND/OR THERAPEUTIC AGENTS
VERWENDUNG VON FULLEREN-DERIVATEN IN DIAGNOSTISCHEN UND/ODER THERAPEUTISCHEN MITTELN
UTILISATION DE FULLERENES DANS DES AGENTS DIAGNOSTIQUES ET/OU

THERAPEUTIQUES
PATENT ASSIGNEE:
NYCOMED SALUTAR, INC., (786902), 428 Oakmead Parkway, Sunnyvale, California 94086, (US), (Proprietor designated states: all)
INVENTOR:
WATSON, Alan, D., 262A Rincon Avenue, Campbell, CA 95008, (US)
KLAVENESS, Jo, Midtasen 5, N-1166 Oslo, (NO)
JAMIESON, Gene, C., 18155 China Grade Road, Boulder Creek, CA 95006, (US)
FELLMANN, Jere, Douglas, 1474 Lexington Way, Livermore, CA 94550, (US)
VOGT, Nils, Blane, Stiftmann Kaas vei 2, N-0852 Oslo, (NO)
COCKBAIN, Julian, R., M., 27 Ladbroke Grove, London W11 3PD, (GB)
LEGAL REPRESENTATIVE:
Cockbain, Julian, Dr. et al (52641), Frank B. Dehn & Co., European Patent Attorneys, 179 Queen Victoria Street, London EC4V 4EL, (GB)
PATENT (CC, No, Kind, Date): EP 625055 A1 941123 (Basic)
EP 625055 B1 000503
WO 9315768 930819
APPLICATION (CC, No, Date): EP 93904187 930211; WO 93GB279 930211
PRIORITY (CC, No, Date): GB 9203037 920211
DESIGNATED STATES: AT; BE; CH; DE; DK; ES; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE
INTERNATIONAL PATENT CLASS: A61K-049/00; A61K-049/04
NOTE:
No A-document published by EPO
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	200018	2337
CLAIMS B	(German)	200018	2200
CLAIMS B	(French)	200018	2701
SPEC B	(English)	200018	11541
Total word count - document A			0
Total word count - document B			18779
Total word count - documents A + B			18779

6/3,AB/20 (Item 9 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00579153
Molecular recording/reproducing method and recording medium.
Molekulare Aufzeichnungs-/Wiedergabemethode und Aufzeichnungsmedium.
Methode d'enregistrement/reproduction moleculaire et milieu d'enregistrement.
PATENT ASSIGNEE:
International Business Machines Corporation, (200120), Old Orchard Road, Armonk, N.Y. 10504, (US), (applicant designated states: CH;DE;FR;GB;LI)
INVENTOR:
Gimzewski, James, Dr., Seefeldstrasse 112, CH-8008 Zurich, (CH)
Parrinello, Michele, Prof.Dr., Seestrasse 228, CH-8810 Horgen, (CH)
Reihl, Bruno, Dr., Wilenstrasse 150, CH-8832 Wilen, (CH)
LEGAL REPRESENTATIVE:
Klett, Peter Michael (80772), International Business Machines Corporation, Saumerstrasse 4, 8803 Ruschlikon, (CH)
PATENT (CC, No, Kind, Date): EP 591595 A1 940413 (Basic)
APPLICATION (CC, No, Date): EP 92810762 921008;
PRIORITY (CC, No, Date): EP 92810762 921008

DESIGNATED STATES: CH; DE; FR; GB; LI
INTERNATIONAL PATENT CLASS: G11B-009/00;
ABSTRACT EP 591595 A1
A recording and reproducing method for binary coded information and a suitable recording medium are described, which use endohedrally doped cagelike molecules 30, especially fullerenes and derivatives thereof, as storage elements. By applying a probing tip 36 to the molecule for the read/write process an enhanced storage density is achieved. (see image in original document)
ABSTRACT WORD COUNT: 57

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF2	427
SPEC A	(English)	EPABF2	3034
Total word count - document A			3461
Total word count - document B			0
Total word count - documents A + B			3461

6/3,AB/21 (Item 1 from file: 99)
DIALOG(R)File 99:Wilson Appl. Sci & Tech Abs

2365355 H.W. WILSON RECORD NUMBER: BAST01026663
Dissolution of full-length single-walled *carbon"** *nanotubes"**
Chen, Jian; Rao, Apparao M; Lyuksyutov, Sergei
The Journal of Physical Chemistry B v. 105 no13 (Apr. 5 2001) p. 2525-8
DOCUMENT TYPE: Feature Article ISSN: 1089-5647

ABSTRACT: Full-length single-walled *carbon"** *nanotubes"** (SWNTs) were rendered soluble in common organic solvents by noncovalent (ionic) functionalization of the carboxylic acid groups present in the purified SWNTs. Atomic force microscopy (AFM) showed that the majority of the SWNTs ropes were exfoliated into small ropes (2-5 nm in diameter) and individual *nanotubes"** with lengths of several micrometers during the dissolution process. The combination of multiwavelength laser excitation Raman scattering spectroscopy and solution-phase visible and near-infrared spectroscopies was used to characterize the *library"** of SWNTs that is produced in current preparations. The average diameter of metallic *nanotubes"** was found by Raman spectroscopy to be smaller than that of semiconducting *nanotubes"** in the various types of full-length SWNT preparations. This observation sheds new light on the mechanism of SWNT formation. Reprinted by permission of the publisher.

6/3,AB/22 (Item 2 from file: 99)
DIALOG(R)File 99:Wilson Appl. Sci & Tech Abs

2115852 H.W. WILSON RECORD NUMBER: BAST00046945
Genetic variation before your eyes
Rawls, Rebecca L;
Chemical & Engineering News v. 78 no30 (July 24 2000) p. 37-8
DOCUMENT TYPE: Feature Article ISSN: 0009-2347

ABSTRACT: An innovative collaboration that is attempting to apply

state-of-the-art nanotechnology to functional genomics is under way at Massachusetts Institute of Technology (MIT). A team led by Harvard University chemistry professor Charles M. Lieber and MIT biology professor David E. Housman is using an ultrasensitive atomic force microscope fitted with a *carbon"** *nanotube"** tip to see which of the many variations in gene sequence that are quickly being identified in the human genome are located on the same strands of *DNA"**. According to Chad A. Mirkin, a chemistry professor at Northwestern University and director of the Institute for Nanotechnology and the Center for Nanofabrication & Molecular Self Assembly at Northwestern, the work is a vital step toward the use of scanning *probe"** techniques for addressing and solving biological problems. Details of the research are provided.

6/3,AB/23 (Item 1 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04935863 H.W. WILSON RECORD NUMBER: BGSA02185863
Science news of the year.
Science News v. 160 no25/26 (Dec. 22-29 2001) p. 402-10
SPECIAL FEATURES: il ISSN: 0036-8423
LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 6250

ABSTRACT: Some of the most important scientific achievements in anthropology and archaeology, astronomy, behavior, biomedicine, botany and zoology, cell and molecular biology, chemistry, earth science, environment and ecology, food science and nutrition, mathematics and computers, paleobiology, physics, and technology in 2001 are listed.

6/3,AB/24 (Item 2 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04757418 H.W. WILSON RECORD NUMBER: BGSA02007418
The state of innovation.
Technology Review (Cambridge, Mass.: 1998) v. 105 no5 (June 2002) p. 55-63
ISSN: 1099-274X
LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 5432

ABSTRACT: A special section on the technologies that will transform industries or produce new ones in the next five to ten years. Articles discuss such topics as information technology, biomedicine, nanotechnology, and transportation.

6/3,AB/25 (Item 3 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04756604 H.W. WILSON RECORD NUMBER: BGSA02006604
Nanobiotech makes the diagnosis.
Stikeman, Alexandra

Technology Review (Cambridge, Mass.: 1998) v. 105 no4 (May 2002) p. 60-6
SPECIAL FEATURES: il ISSN: 1099-274X
LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 2634

ABSTRACT: The convergence of nanoelectronics and biology is producing biosensors of remarkable sensitivity. Given that biological molecules such as *DNA"** and proteins are about a few nanometers in size and that physicists and chemists are now learning how to make electronic devices on that size scale, biology and electronics are colliding. The result is a new breed of devices that blend the ability of biological molecules to selectively bind with other molecules with the ability of nanoelectronics to instantly spot the slight electrical changes caused by such binding. Apart from detecting the slightest hint of disease or perhaps a single spore of anthrax, these devices could provide far quicker and easier diagnosis of complex diseases. Some of the ambitious goals will probably take years to achieve, but nanobiotech could lead to real devices that will start to replace awkward lab-based procedures with cheap, accurate microchips in as little as two years.

6/3,AB/26 (Item 4 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04670566 H.W. WILSON RECORD NUMBER: BGSA01170566
Less is more in medicine.
Alivisatos, A. Paul
Scientific American v. 285 no3 (Sept. 2001) p. 66-73
SPECIAL FEATURES: il ISSN: 0036-8733
LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 4670

ABSTRACT: Some of the first real-world applications of sophisticated forms of nanotechnology will occur in medicine. Biomedical research, disease diagnosis, and possibly therapy could benefit from nanometer-scale objects constructed from inorganic materials. In addition, the use of specific nanoscale particles as tags or labels would increase the speed, sensitivity, and flexibility of biological tests that measure the presence or activity of selected substances. Nanoparticles could also be exploited in the targeted delivery of drugs, thereby avoiding the harmful side effects frequently associated with potent medicines. In the future, artificial nanoscale building blocks might also be employed to help repair such tissues as skin, cartilage, and bone and to even aid the regeneration of organs.

6/3,AB/27 (Item 5 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04670559 H.W. WILSON RECORD NUMBER: BGSA01170559
The art of building small.
Whitesides, George M
Love, J. Christopher
Scientific American v. 285 no3 (Sept. 2001) p. 38-47

SPECIAL FEATURES: il ISSN: 0036-8733
LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 5808

ABSTRACT: Scientists are developing inexpensive ways of fabricating nanostructures. The development of nanotechnology will be dependent on the ability of scientists to fabricate structures with a diameter smaller than 100 nm in an efficient manner. Although photolithography, which is currently used to manufacture circuits on microchips, can be modified to generate nanometer-scale structures, the modifications would be technically problematic and massively expensive. Nanofabrication approaches can be classified into top-down techniques, which carve out or add aggregates of molecules to a surface, and bottom-up techniques, which amass atoms or molecules into nanostructures. Soft lithography and dip-pen lithography represent 2 examples of promising top-down techniques, whereas bottom-up techniques are already being used to generate quantum dots that can act as biological dyes.

6/3,AB/28 (Item 6 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04670558 H.W. WILSON RECORD NUMBER: BGSA01170558
Little big science.
Stix, Gary
Scientific American v. 285 no3 (Sept. 2001) p. 32-7
SPECIAL FEATURES: graph il ISSN: 0036-8733
LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 3471

ABSTRACT: The nature and potential of nanotechnology are reviewed. Nanotechnology, which borrows liberally from condensed matter physics, engineering, molecular biology, and chemistry, has become the most highly energized discipline in science after biomedical research and defense. The "technology" involves basic research into structures that have at least one dimension of between around 1 and several hundred nanometers. Much of the interest in nanotechnology is driven by the diminishing size of circuits in electronic chips but, in an aberrant way, the visions of a fringe element of futurists also fuel interest in the discipline. To establish itself as a grand unifier of the applied sciences, nanotechnology must illustrate the usefulness of grouping widely disparate endeavors. Indeed, if the nano concept holds together, it could actually lay the groundwork for a new industrial revolution.

6/3,AB/29 (Item 7 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04644481 H.W. WILSON RECORD NUMBER: BGSA01144481
Science news of the year.
AUGMENTED TITLE: scientific develpoments in the year 2000
Miller, Julie Ann
Science News v. 158 no26-27 (Dec. 23-30 2000) p. 418-26
SPECIAL FEATURES: il ISSN: 0036-8423

LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 6500

ABSTRACT: A round-up of the main stories reported in this journal in 2000.

6/3,AB/30 (Item 8 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04503434 H.W. WILSON RECORD NUMBER: BGSA01003434
Wires of wonder.
Technology Review (Cambridge, Mass.: 1998) v. 104 no2 (Mar. 2001) p. 86-91
SPECIAL FEATURES: por ISSN: 1099-274X
LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 2562

ABSTRACT: In 1985, Richard E. Smalley and several colleagues at Rice University created a form of *carbon"** never seen before. The arrangement of *carbon"** atoms in each molecule resembled a tiny geodesic dome, so the team called the material buckminsterfullerene after the architect who popularized the shape. In the early 1990s, researchers made the other astounding discovery that hollow tubes could be made out of the same *carbon"** structure. *Carbon"** *nanotubes"** were many times stronger than steel, had the electrical conductivity of copper, and were the diameter of a *DNA"** molecule. In 2000, Smalley founded *Carbon"** Nanotechnologies to make the commercial quantities of *nanotubes"** that will let other labs push the technology forward, and to develop applications. In an interview, Nobel Prize winner Smalley discusses the special nature and the future of nanotechnology.

6/3,AB/31 (Item 9 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04389468 H.W. WILSON RECORD NUMBER: BGSA00139468
*Nanotubes"** for electronics.
Collins, Philip G
Avouris, Phaedon
Scientific American v. 283 no6 (Dec. 2000) p. 62-9
SPECIAL FEATURES: il ISSN: 0036-8733
LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 4291

ABSTRACT: *Nanotubes"** have been the object of intense study since they were first discovered nearly 10 years ago. Made of pure *carbon"**, *nanotubes"** are incredibly strong, prompting fantastic predictions of microscopic robots, dent-resistant car bodies, and earthquake-resistant buildings. Recently, however, they have become a subject for engineering due to their unique electronic properties. *Nanotubes"** have been found to have a variety of band gaps and conductivities and also the ability to emit electrons at relatively low voltages without burning out. The electrical applications of these properties are discussed.

6/3,AB/32 (Item 10 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04255513 H.W. WILSON RECORD NUMBER: BGSA00005513
The century in science.
AUGMENTED TITLE: 1900-1998
Poindexter, Joseph
Discover v. 21 no1 (Jan. 2000) p. 52-61
SPECIAL FEATURES: il ISSN: 0274-7529
LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 8934

ABSTRACT: The writer discusses the most important scientific advances between 1900 and 1998.

6/3,AB/33 (Item 11 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text

04009217 H.W. WILSON RECORD NUMBER: BGSA99009217
Will the real nanotech please stand up?.
Rotman, David
Technology Review (Cambridge, Mass.: 1998) v. 102 no2 (Mar./Apr. 1999) p. 46-53
SPECIAL FEATURES: il ISSN: 1099-274X
LANGUAGE: English
COUNTRY OF PUBLICATION: United States
WORD COUNT: 4862

ABSTRACT: A special section on nanotechnology. After decades of visionary speculation, a wealth of new research and the first basic devices are defining the framework of nanotechnology. An increasing number of researchers believe that controlling the structure of materials down to a few atoms or molecules will have a huge effect on everything from computing to medicine. Moreover, newly developed high-tech tools, particularly *probes"** that are sufficiently sensitive to both image and manipulate individual atoms and molecules, have started to turn former science fiction fantasies into reality. Topics discussed include *carbon"** *nanotubes"** and the problems of developing a practical way to mass-produce any device on the nanoscale.

6/3,AB/34 (Item 1 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01867742 AADAAI3038462
*Carbon"** *nanotubes"** as molecular *probes"** for scanning *probe"** microscopy
Author: Cheung, Chin Li
Degree: Ph.D.
Year: 2002
Corporate Source/Institution: Harvard University (0084)
Source: VOLUME 63/01-B OF DISSERTATION ABSTRACTS INTERNATIONAL.

PAGE 279. 229 PAGES
ISBN: 0-493-51620-4

Atomic force microscopy (AFM) is an important tool for characterizing surfaces and intermolecular forces because of its imaging and force sensing capabilities in vacuum, ambient condition, and liquid. In this thesis, we present our efforts towards the creation of high-resolution AFM *probes"** with *carbon"** *nanotubes"** and their applications to chemistry and biology.

We present our efforts towards the creation of *carbon"** *nanotube"** AFM *probes"**. Four reproducible methods for fabrication of *carbon"** *nanotube"** tips are discussed: (1) Mechanical mounting of *nanotubes"**. (2) Pore directed growth of *nanotube"** AFM *probes"** using chemical vapor deposition (CVD). (3) Direct CVD growth of *nanotubes"** on AFM *probes"**. (4) “Picking up” vertically grown CVD *nanotube"** with AFM *probes"**. Then, we discuss the optimal conditions for AFM imaging with *carbon"** *nanotube"** tips. We found that the tip-sample interactions during tapping mode AFM imaging could be either attractive or repulsive.

We also discuss five applications of *carbon"** *nanotube"** tips to chemistry and biology. First, we present the application of functionalized SWNT *carbon"** *nanotube"** tips for chemical force microscopy through examples of force titrations and functional mapping of patterned self-assembled monolayer surfaces. Second, we investigate the role of hSWI/SNF enzymes in chromatin remodeling. hSWI/SNF was found to remodel mononucleosomes into compact dimers. It remodeled polynucleosomes by shuffling the regularly spaced nucleosomes into clusters on the *DNA"**. Third, we investigate the structural implication of enhanceosome and CREB-binding protein (CBP) in gene regulation. When CBP binded to the enhanceosome, a dramatic reorganization and compaction of the complex from a linear array of transcription factors was observed. Fourth, we study the indentation of diapalmitoylphosphatidylcholine lipid bilayer with *carbon"** *nanotube"** tips of different diameters. The bilayer rupture force was found to scale linearly with the cross-sectional area of the flat *nanotube"** tips. Fifth, we report a novel approach to construct SWNT structures on surfaces by using long *nanotubes"** on *nanotube"** tips as building blocks.

Finally, we describe preliminary results on three future applications of *carbon"** *nanotube"** tips: (1) *Carbon"** *nanotubes"** tips as nanostraws and nanoink-jet. (2) *Carbon"** *nanotube"** tips for molecular friction measurement. (3) *Carbon"** *nanotubes"** as electromechanical switches.

6/3,AB/35 (Item 2 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01856456 AADAAI3028375
Nanoprobes: The heart of scanning force microscopies
Author: Chen, Liwei
Degree: Ph.D.
Year: 2001
Corporate Source/Institution: Harvard University (0084)
Source: VOLUME 62/10-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 4561. 178 PAGES
ISBN: 0-493-40652-2

Nanoprobes are of central importance in scanning force microscopies (SFM) because they give rise to not only the fundamental properties of SFM, piconewton force sensitivity and nanometer spatial resolutions, but also the versatility of measuring various material properties other than surface topology. This thesis describes explorations on both the depth and versatility of SFM technologies by developing new nanoprobes.

Molecular recognitions between complementary and mismatched *oligonucleotides"** were studied by introducing nanoprobes with well-defined surface chemical groups and functionalized with short *oligonucleotide"** strands. The results indicate that the mechanical property of a *DNA"** duplex is very sensitively dependent on the sequence and structure at the local base pair level.

Magnetic Feedback Force Spectroscopy (MFFS) was implemented to *probe"** complete force profiles aiming at understanding the free energy landscapes in systems such as molecular recognitions. The force profiles obtained for hydroxyl terminated SAMs on both the tip and the surface showed that the interaction could be well fit with van der Waals model. However, the force contribution from the chemical groups at the SAM surface was covered by the VDW interaction between the supporting gold layers.

*Carbon"** *nanotube"** *probes"** make potentially ideal *probes"** for minimizing VDW background as well as in structural imaging because of the intrinsic small diameters, high aspect ratio and reversible buckling. We improved the stability of *carbon"** *nanotube"** *probes"** in fluid for the purpose of imaging dynamic processes such as the relaxation of supercoiled *DNA"** plasmids. The chemical functionality at the end of SWNT was demonstrated by force titration and chemically sensitive phase imaging on patterned surfaces, however, direct evidence of the chemical functionalization reaction such as TEM micrographs is still missing.

Combined experimental measurements and numerical simulations showed that the cantilever dynamics in tapping mode were affected by many imaging parameters and material properties. The cantilever motion bears instabilities that are characteristic of non-linear dynamic systems and the cantilever dynamics strongly influences the imaging resolution. The tip-broadening effect reached the geometrical limit when the cantilever motion was in the intermittent contact mode, and it became greater than the tube diameter in true non-contact mode due to the long-range interaction.

Lastly, the target searching mechanism of a *DNA"** repair enzyme, hOgg1, which specifically binds to the damaged base 8-oxoG:C pair, was studied by single molecule AFM imaging with SWNT *probes"**. Conventional methods such as crystallography or NMR are ill-suited because of the heterogeneity of the substrate. Snap shots of hOgg1 binding on non-specific *DNA"** revealed linear and bent forms of nonspecific complexes. The bending angle in the bent structure was, 70°, the same as that in specific complexes. Future works may study the kinetics of the mechanism in real-time and in the fluid environment.

6/3,AB/36 (Item 3 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01826510 AADAAI0802502
Resonance Raman spectroscopy of single-walled *carbon"** *nanotubes"**
Author: Brown, Sandra Dawn Marie
Degree: Ph.D.
Year: 2000
Corporate Source/Institution: Massachusetts Institute of Technology (0753)

Source: VOLUME 62/03-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 1438.

The unusual one-dimensional properties of phonons in crystalline arrays of *carbon"** *nanotubes"** is presented. The main technique for probing the phonon spectra is Raman spectroscopy and the many unique and unusual features of the Raman spectra of *carbon"** *nanotubes"** are highlighted. The strong coupling between electrons and phonons in this one-dimensional system furthermore gives rise to highly unusual resonance Raman spectra, and unique features in the Stokes and anti-Stokes Raman spectra.

The Raman tangential G-band feature associated with semiconducting *nanotubes"** have a different characteristic lineshape than those associated with metallic *carbon"** *nanotubes"**. The differences in the electronic density of states of metallic *nanotubes"** relative to semiconducting *nanotubes"** leads to differing resonance behaviors, thus resulting in differing lineshapes in the tangential G-band region of the Raman spectrum.

The anti-Stokes Raman spectra of single-wall *carbon"** *nanotubes"** (SWNTs) are unique relative to other crystalline systems, especially in exhibiting large asymmetries with regard to their corresponding Stokes spectra.

Analysis of the second-order resonant Raman spectra of single-walled *carbon"** *nanotubes"** using different laser energies in the range 1.58–2.71eV is presented. Major emphasis is given to the overtones and combination modes associated with the two dominant features of the first-order spectra, the radial breathing mode and the tangential mode.

The surface-enhanced resonant Raman scattering (SERRS) spectra of single-walled *carbon"** *nanotubes"** (SWNTs) adsorbed on silver and gold metal island films and on colloidal silver cluster substrates were investigated using different laser excitation wavelengths. The observed enhancement in the SERRS signal of the SWNTs results from: (1) an “electromagnetic” SERS enhancement due to resonances between optical fields and the electronic excitations in the metallic nanostructures, (2) a “chemical” SERS enhancement due to the interaction between the SWNTs and the metal surfaces, and (3) a selective resonance Raman effect between the incident and scattered photons and electronic transitions between the 1D van Hove singularities in the electronic density of states of metallic and semiconducting *nanotubes"**. (Copies available exclusively from MIT *Libraries"**, Rm. 14-0551, Cambridge, MA 02139-4307. Ph. 617-253-5668; Fax 617-253-1690.) (Abstract shortened by UMI.)

6/3,AB/37 (Item 4 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01694794 AAD9921544
*CARBON"** *NANOTUBE"** TIPS AS NANOMETER SCALE *PROBES"** FOR CHEMISTRY AND BIOLOGY (AMYLOID FIBRILS, PH, ATOMIC FORCE MICROSCOPY)
Author: WONG, STANISLAUS SHERWOOD
Degree: PH.D.
Year: 1999
Corporate Source/Institution: HARVARD UNIVERSITY (0084)
Source: VOLUME 60/03-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 1107. 200 PAGES

Of an intrinsic structural beauty, *carbon"** *nanotubes"** (NTs) consist of concentrically nested shells of sp<super>2</super>-hybridized (trivalent) *carbon"** atoms forming a hexagonal network that is itself arranged helically within the tubular motif. Synthesized and purified NTs represent an ideal structure for the *probe"** tips used in many scanning *probe"** microscopies, such as atomic force +microscopy (AFM). In addition to the high aspect ratio of NTs, which allows for probing deep crevices, their unique ability to buckle elastically makes these tips very robust while limiting the maximum force applied to delicate organic and biological samples. Both multi wall (MWNT) and single-wall (SWNT) *carbon"** *nanotubes"** have been attached to the ends of single crystal silicon cantilever-tip assemblies.

Initial imaging studies have addressed their potential to improve lateral resolution as well as to *probe"** biological systems. Amyloid <math> <f> <g>b</g></f> </math>(1–40) derived protofibrils and fibrils, implicated in Alzheimer's disease, have been imaged with MWNT tips, yielding a 12–30% improvement in lateral resolution, compared with conventional Si tips. With SWNT tips, the improvement in resolution is 70% for imaging amyloid and double-stranded *DNA"**. Moreover, SWNT tips have been used to resolve substructure within dispersed SWNTs on surfaces. Because individual SWNTs have radii of 0.5–0.7 nm, strategies for achieving molecular-resolution imaging are discussed.

Both MWNT and SWNT tips have been chemically modified to present acidic, basic, and hydrophobic functionality. Force titrations recorded between these NT tips and hydroxy-terminated self-assembled monolayers (SAMs) show (i) finite adhesion at low pH and no measurable adhesion at high pH for unmodified, carboxyl-terminated NT tips, (ii) no measurable adhesion at low pH and finite adhesion at high pH for amine-terminated NT tips, and (iii) pH independent adhesion for phenyl-terminated NT tips. This adhesion vs. pH behavior is consistent with the tip functionalities. Furthermore, MWNT tips modified with biotin have been used to measure the binding force between single streptavidin-biotin pairs.

In addition, functionalized *nanotube"** tips have been used to map chemical domains on surfaces with nanometer resolution. Intermittent contact phase images obtained in ethanol on methyl/carboxyl patterned SAMs show greater phase lag between the carboxyl regions and COOH terminated NT tips, whereas phase images taken with phenyl terminated tips exhibit greater phase lag in the methyl terminated areas in agreement with the expected adhesion trends. Furthermore, images of partial bilayer structures that present carboxyl and methyl functionalities show that SWNT tips yield chemically-sensitive lateral resolution of ∼3 nm. These new AFM *probes"** provide a clear pathway for achieving molecular resolution, chemically sensitive imaging of chemical and biological systems.

6/3,AB/38 (Item 1 from file: 266)
DIALOG(R)File 266:FEDRIP

00332502
IDENTIFYING NO.: 5R01GM59666-02 AGENCY CODE: CRISP
HIGH RESOLUTION IMAGING WITH *CARBON"** *NANOTUBE"** *PROBES"**
PRINCIPAL INVESTIGATOR: LIEBER, CHARLES M
ADDRESS: HARVARD UNIVERSITY 12 OXFORD ST CAMBRIDGE, MA 02138
PERFORMING ORG.: HARVARD UNIVERSITY, CAMBRIDGE, MASSACHUSETTS
SPONSORING ORG.: NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES
FY : 2001

SUMMARY: DESCRIPTION (adapted from applicant's abstract): Elucidating the structure of proteins, *nucleic"** acids, and assemblies of these macromolecules provides information critical to understanding and ultimately enabling the control of biological function. Atomic force microscopy (AFM) is a powerful technique that has been utilized to *probe"** the structure and dynamics of biological systems, and thus can advance significantly knowledge of biological function. The level of information in AFM images depends critically on the size, shape and terminal functionality of the tips used for imaging. Commercial tips have exhibited impressive resolution on packed molecular arrays but lower resolution on isolated proteins, and can show significant tip-to-tip variations in resolution. To overcome limitations of present tips and better exploit the potential of AFM, the present study will focus on the development and application of *carbon"** *nanotube"** *probes"**. *Carbon"** *nanotubes"** have several features that make them ideal for structural biological, including high aspect ratios for imaging deep and narrow features and potential resolution better than 0.5 nanometers. Moreover, the well-defined molecular structure of *nanotubes"** should enable the synthesis of identical size and resolution tips, and the modification of *nanotube"** ends for imaging with chemical sensitivity.

The overall aims of this project are to develop the methodologies needed to prepare *carbon"** *nanotube"** tips with reproducible ultrahigh structural resolution, to develop approaches for modifying *nanotubes"** ends for functional imaging, and to exploit *carbon"** *nanotube"** tips to elucidate the mechanism of chromatin remodeling by SWI/SNF and other complexes. Metal-catalyzed chemical vapor deposition will be used to synthesize and thereby directly control the *carbon"** *nanotube"** tips. Electron microscopy imaging of *nanotube"** tips and AFM imaging of standards and protein model systems with the same tips will be used to define the relationships between synthesis, structure and resolution. Chemical reactions will be used to localize *probe"** species, including basic organic functional groups and more complex *ligands"**, at the ends of *nanotube"** tips. The resolution of the modified *probes"** in mapping chemically-distinct residues and binding sites will be defined using monolayer, bilayer and protein systems. *Carbon"** *nanotube"** tips will be used to determine the structures of the products produced by ATP-dependent SWI/SNF remodeling of mononucleosomes and polynucleosomes, to study the structure(s) of the SWI/SNF complex, to analyze the role that higher order chromatin structure has on remodeling, and to study remodeling by nucleosome remodeling deacetylase complex.

6/3,AB/39 (Item 2 from file: 266)
DIALOG(R)File 266:FEDRIP

00319690
IDENTIFYING NO.: 1Z01DK29033-02 AGENCY CODE: CRISP
Theory And Simulation Of Protein Dynamics, Folding, And Function
PRINCIPAL INVESTIGATOR: HUMMER, GERHARD
ADDRESS: NIDDK, NIH
SPONSORING ORG.: NAT INST OF DIABETES AND DIGESTIVE AND KIDNEY DISEASES
FY : 2001
SUMMARY: We have made significant progress in four major areas related to protein dynamic s, folding, and function. (1) Water transport through channels. From a theoreti cal and simulation study of the simplest molecular channel, a *carbon"** *nanotube"** , w e could demonstrate a mechanism of water transport through water channels such a s aquaporin-1,

with burst-like kinetics, and concerted water motion (Hummer et al., Nature, 8-Nov-2001). (2) Theory of single-molecule experiments. Atomic force microscopes and laser tweezers are increasingly used folding, and function of single molecules. We derived a rigorous relation betwee n these non-equilibrium measurements and the thermodynamics of binding and foldi ng (Hummer and Szabo, PNAS 98, 3658, 2001; Commentary by Jarzynski, same issue). (3) *Ligand"** binding and hydrophobic effects. We mapped the binding affinity of nonpolar *probes"** to a fusion active intermediate of HIV-1 gp41 by using a combina reproducing crystallographically identified inhibitor-binding sites, we could su ggest an extension of existing inhibitors that should enhance binding (Siebert a nd Hummer, Biochemistry, submitted). (4) Protein and *peptide"** folding. By using small *peptides"** in solution, we could directly compare loop-closure kinetics of m odels to triplet-quenching measurements. This provides molecularly-detailed desc riptions of early events in protein folding (Yeh and Hummer, in preparation).

Set	Items	Description
S7	0	AU=(HANNAH, E? OR HANNAH E?) AND S1
S8	0	AU=(HANNAH, E? OR HANNAH E?) AND (NANOTUB? OR NANO(W)TUBE?)

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File 144:Pascal 1973-2002/Dec W4
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File 348:EUROPEAN PATENTS 1978-2002/Dec W03
(c) 2002 European Patent Office
File 99:Wilson Appl. Sci & Tech Abs 1983-2002/Nov
(c) 2002 The HW Wilson Co.
File 98:General Sci Abs/Full-Text 1984-2002/Nov
(c) 2002 The HW Wilson Co.
File 35:Dissertation Abs Online 1861-2003/Dec
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File 266:FEDRIP 2002/Nov
Comp & dist by NTIS, Intl Copyright All Rights Res
File 315:ChemEng & Biotec Abs 1970-2003/Dec
(c) 2003 DECHEMA

Set	Items	Description
S1	6790	(NANOTUB? OR NANO(W)TUBE? ?) AND (SIC OR (SILICON OR SI)(W)(C OR CARBIDE) OR CARBON)
S2	12	S1 AND LIBRAR?
S3	425	S1 AND PROBE? ?
S5	37	S3 AND (OLIGONUCLEOTIDE? ? OR NUCLEOTIDE? ? OR PEPTIDE? ? OR NUCLEIC OR DNA OR DEOXYRIBONUCLEIC OR DEOXY(W)RIBONUCLEIC OR LIGAND? ?)
S6	46	S2 OR S5
S7	6793	((NANOTUB? OR NANO(W)TUBE? ?) AND (SIC OR (SILICON OR SI)(W)(C OR CARBIDE) OR CARBON)) OR CNT(10N)(NANOTUB? OR NANO(W)TUBE? ?) OR SWNT(S)(NANOTUB? OR NANO(W)TUBE? ?)
S8	12	S7 AND LIBRAR?
S9	426	S7 AND PROBE? ?
S10	42	S9 AND (OLIGONUCLEOTIDE? ? OR NUCLEOTIDE? ? OR PEPTIDE? ? OR NUCLEIC OR DNA OR DEOXYRIBONUCLEIC OR DEOXY(W)RIBONUCLEIC OR LIGAND? ? OR POLYPEPTIDE? ? OR POLYPROTEIN? ? OR PROTEIN? ?)
S11	5	(S8 OR S10) NOT S6
S12	5	RD (unique items)

12/3,AB/1 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal

14633840 PASCAL No.: 00-0304586
*Carbon"** *nanotubes"** as *probes"** for atomic force microscopy
STEVENS R M D; FREDERICK N A; SMITH B L; MORSE D E; STUCKY G D; HANSMA P K
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Journal: Nanotechnology : (Bristol), 2000, 11 (1) 1-5
Language: English
Tip-derived artifacts remain one of the chief limitations of atomic force

microscopy (AFM) when attempting to measure sub-nanometre structures. *Carbon"** *nanotubes"** represent ideal structures for use as AFM tips because of their small diameter, high aspect ratio and high strength. We attached single *carbon"** *nanotube"** AFM tips using a novel arc discharge method. Using these modified tips, we successfully imaged a *protein"** filament found in sponge spicules of Tethya aurantia. We report a modular stave-like structure for the *protein"** filament that was previously unobservable with conventional AFM cantilevers.

12/3,AB/2 (Item 2 from file: 144)
DIALOG(R)File 144:Pascal

13123197 PASCAL No.: 97-0105343
Morphological modeling of atomic force microscopy imaging including nanostructure *probes"** and fibrinogen molecules
WILSON D L; KUMP K S; BENARD W; XUE P; MARCHANT R E; EPPELL S J
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Journal: Journal of vacuum science & technology. B. Microelectronics and nanometer structures. Processing, measurement and phenomena, 1996-07, 14 (4) 2407-2416
Language: English
Due to the finite size of the *probe"** tip, atomic force microscopy (AFM) images of biomolecules, and other structures similar in size, are laterally enlarged. We use mathematical morphology, a non-linear image processing method, to model the interaction between *probe"** tip and sample. In a typical imaging situation, baseline dimensions are most affected by the *probe"** and widths can be 80% tip and 20% molecule. Using the morphological model and a known tip, we can restore the image so that it more closely resembles the actual surface. Morphological restoration is ideal in some regions, giving the exact sample surface, and improved in others. In the case of a *carbon"** *probe"**, restoration increases the perfectly obtained surface area by as much as 160 times. Following restoration, lateral widths at fixed heights are improved by as much as 75%. Restoration greatly improves image resolution even if one uses *probes"** consisting of very small candidate structures, e.g., *nanotubes"** and Bucky balls. The tip imaging process is also modeled, and we find that calibration spheres should be larger than the molecules of interest and that for many tips, there is little or no advantage to using smaller spheres. A blood plasma *protein"**, fibrinogen, is modeled, and AFM and restored images of single molecules are computed. (c) 1996 American Vacuum Society

12/3,AB/3 (Item 1 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01350373
NANOTWEEZERS AND NANOMANIPULATOR
Nanopinzette und Nanomanipulator
NANOPINCES ET NANOMANIPULATEUR
PATENT ASSIGNEE:
Daiken Chemical Co. Ltd., (2737720), 7-19, Hanaten-nishi 2-chome, Joto-ku , Osaka-shi, Osaka 536-0011, (JP), (Applicant designated States: all)
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LEGAL REPRESENTATIVE:
Schickedanz, Willi, Dr. Dipl.-Ing. et al (10191), Langener Strasse 68, 63073 Offenbach, (DE)
PATENT (CC, No, Kind, Date): EP 1193216 A1 020403 (Basic)
WO 200166460 010913
APPLICATION (CC, No, Date): EP 2001912179 010308; WO 2001JP1803 010308
PRIORITY (CC, No, Date): JP 2000112767 000308; JP 2000404006 001207
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE; TR
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: B82B-001/00

ABSTRACT EP 1193216 A1
To provide nanotweezers and a nanomanipulator which allow great miniaturization of the component and are capable of gripping various types of nano-substances such as insulators, semiconductors and conductors and of gripping nano-substances of various shapes.
Electrostatic nanotweezers 2 are characterized in that the nanotweezers 2 are comprised of a plurality of *nanotubes"** whose base end portions are fastened to a holder 6 so that the *nanotubes"** protrude from the holder 6, coating films which insulate and cover the surfaces of the *nanotubes"**, and lead wires 10, 10 which are connected to two of the *nanotubes"** 8, 9; and the tip ends of the two *nanotubes"** are freely opened and closed by means of an electrostatic attractive force generated by applying a voltage across these lead wires. Furthermore, by way of forming a piezo-electric film 32 on the surface of the *nanotube"** 9, and the tip ends of the *nanotubes"** are freely opened and closed by expanding and contracting the piezo-electric film, thus allowing any desired nano-substances to be handled regardless of whether the nano-substances are insulators, semiconductors or conductors. Furthermore, if by way of designing three *nanotubes"** so as to be freely opened and closed by an electrostatic system, nano-substances of various shapes such as spherical, rod-form, etc.
ABSTRACT WORD COUNT: 209
NOTE:
Figure number on first page: 1

LANGUAGE (Publication,Procedural,Application): English; English; Japanese
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200214	565

SPEC A	(English)	200214	8454
Total word count - document A			9019
Total word count - document B			0
Total word count - documents A + B			9019

12/3,AB/4 (Item 1 from file: 266)
DIALOG(R)File 266:FEDRIP

00365933
IDENTIFYING NO.: 2R44RR13251-02 AGENCY CODE: CRISP
SENSING A MODE AFM FOR THE LIFE SCIENCES
PRINCIPAL INVESTIGATOR: HOUGH, PAUL V
ADDRESS: LIFE AFM 25 EAST LOOP RD LIHTI STONY BROOK, NY 11790-3350
PERFORMING ORG.: LIFEAFM, PORT JEFFERSON, NEW YORK
SPONSORING ORG.: NATIONAL CENTER FOR RESEARCH RESOURCES
FY : 2001
SUMMARY: DESCRIPTION: This proposal aims to develop an Atomic Force Microscope controller that will achieve high resolution (by means of the smallest diameter *probes"**) and lowest specimen damage (by means of low adherence *probes"**). The result will be an instrument capable of non-destructive, high-resolution, real-time imaging of functioning single molecules. The proposed work also includes the use of *carbon"** *nanotubes"** as *probes"** that provide high resolution and accurately measure the chemical force between *probe"** molecule and specimen. PROPOSED COMMERCIAL APPLICATION: Not Available

12/3,AB/5 (Item 2 from file: 266)
DIALOG(R)File 266:FEDRIP

00328878
IDENTIFYING NO.: 2R01GM27137-21 AGENCY CODE: CRISP
New *Probes"** and Reagents for AFM Studies
PRINCIPAL INVESTIGATOR: KEANA, JOHN F
ADDRESS: UNIVERSITY OF OREGON 1253 UNIV OF OREGON EUGENE, OR 97403-1253
PERFORMING ORG.: UNIVERSITY OF OREGON, EUGENE, OREGON
SPONSORING ORG.: NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES
FY : 2001
SUMMARY: DESCRIPTION: (Applicant's Descritpion) Atomic force microscopy (AFM) is a
powerful, relatively recent and rapidly expanding molecular imaging technique of broad applicability. AFM is providing for the first time images of individual biomolecules in their native state in aqueous solution. Important biological events in real time may be imaged by AFM. These include time lapse images of the assembly and deposition of amyloid fibrils, a process central to
the onset of fatal diseases such as Alzheimer's disease. Nearly all type II diabetes mellitus patients have cytotoxic pancreatic amyloid, the formation of which is thought to be directly related to the development of the disease. In AFM, the sample is placed on an atomically flat surface such as freshly cleaved mica and is raster scanned by a sharp tip mounted at the end of a flexible cantilever. Resolution for biological specimens is typically 50-100 Angstroms and is limited by the sharpness of the tip. The sharpest tips available commercially for tapping mode AFM have a radius of approximately 4-50 nm. Recently, single walled *carbon"** *nanotubes"**

were attached to AFM tips and show the best combination of' aspect ratio (tip height/base) and sharpness (approximately 3 nm) reported to date. The long term objective of this research program is to enhance the capabilities of AFM by providing a series of novel, molecularly sharp tips designed to improve the resolution of AFM images, i.e. the level of detail one can observe, without the need for highly specialized equipment. This proposal builds on the successful modular synthesis of prototype tip molecules during the first two years of the project. The synthetic tips have a broad base designed to attach chemically to a commercial tip so that only a single molecule can fit on the outermost part of the tip. The synthetic tips taper to a single atom or functional group designed to *probe"** the sample. Prototype synthetic tip molecules prepared in our laboratory are themselves visible using conventional AFM, demonstrating the rigidity and robustness of the molecules. One aim is to synthesize new tip molecules with increased breadth of the base and height. These will be imaged by conventional AFM to determine the best synthetic building blocks to use in terms of rigidity. Another aim is to develop methodology for attaching the new tips to a conventional tip and to determine the resolution provided by the new synthetic tips. The tips are designed so that the functional group probing the sample can be changed. For example, a single biomolecule, e.g. an antibody, may be attached and used to *probe"** the sample. The concept of an AFM label will be developed. The significance lies in the enhanced resolution that should be obtainable with the new synthetic tips.
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